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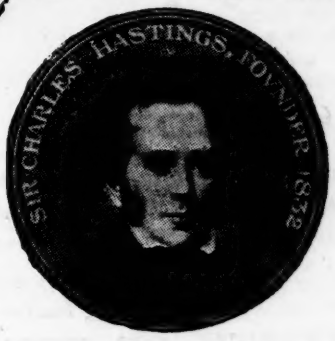

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A British Medical Association Lecture

ON

SOME RECENT ADVANCES IN THE PHYSIOLOGY OF RESPIRATION, RENAL SECRETION, AND CIRCULATION.*

BY

J. S. HALDANE, M.D., F.R.S.,

OXFORD.

In this lecture I shall endeavour to summarize the results of a number of recent investigations, with most of which I have been closely associated, on respiration, renal excretion, and circulation, and to point out, as far as I am able, their significance in helping us to understand the symptoms of disease and the real characters of that marvellous living body with which our profession has to deal. I will begin with respiration, as it was from the side of respiration that I myself, in conjunction with Professor Lorrain Smith, Professor Pembrey, Dr. Priestley, Professor Boycott, Dr. Douglas, and others who worked along with me, approached the subjects of this lecture.

Regulation of CO_2 Pressure in Arterial Blood.

The rate, depth, and regularity of breathing vary greatly at different times. A graphic record of my breathing while I am giving this lecture would, for instance, present an apparent picture of hopeless irregularity in every direction. If, however, we collect the expired air minute by minute we find that the samples obtained do not vary very much in composition. This suggests underlying regulation; and in order to test this more closely Priestley and I, about eighteen years ago, investigated the air present in the lung alveoli, of which we found that a sample can easily be obtained by catching the last parts of the air expired in a deep expiration. This investigation showed that whether the breathing was rapid or slow, provided only that there was no voluntary interference with its depth, the mean percentage of CO_2 in the alveolar air was maintained extraordinarily steady—far more steady than in the expired air, which is, of course, a variable mixture of the alveolar air with air contained in the air passages at the beginning of expiration.

Addition of moderate amounts of CO_2 to the inspired air, or moderate increases, owing to muscular exertion, of the amount of CO_2 produced in the body, hardly altered the alveolar CO_2 percentage except momentarily. The breathing was simply increased sufficiently to keep the alveolar CO_2 percentage almost exactly the same. Nor did great increases or moderate diminutions in the oxygen percentage of the inspired air alter the CO_2 percentage. By varying the barometric pressure we showed also that it is the partial pressure or concentration of CO_2 in a given volume of air that is kept so constant. At a barometric pressure of two atmospheres, for instance, the percentage of CO_2 which is maintained in the alveolar air is only half that at one atmosphere; but this means that the partial pressure or concentration of CO_2 is the same.

Now the arterial blood leaving the lungs is saturated with CO_2 at the same partial pressure as exists in the alveolar air; and this arterial blood in its turn saturates the respiratory centre at a similar partial pressure, and by so doing stimulates it to activity. The latter saturation, however, takes a little time, since the capacity of the body liquids for holding CO_2 in combination and simple solution is relatively large. The breathing, therefore, responds gradually and smoothly to any change in the alveolar CO_2 pressure, just as if the respiratory governor was associated with a fly-wheel; and at the same time the vagus reflex which governs the depth of breathing is accurately adjusted so that depth and frequency harmonize with one another. The response is extremely delicate. We found that in most persons there is about 5.6 per cent. of CO_2 in the alveolar air. If, by adding sufficient CO_2 to the inspired air, this percentage was raised by 0.2, the breathing during rest was doubled. If, on the other hand, the mean percentage was lowered by 0.2 by voluntary forced breathing, natural breathing ceased for the time, a temporary apnoea being produced. Calculation shows that the corresponding increase or diminution in the free CO_2 contained in the arterial blood was only two parts by weight in a million of blood. This at once affords an idea of the astounding delicacy of physiological regulation. Physiology is an exact quantitative science, and for the purpose of these investigations I had to improve the existing methods of gas analysis. But what we are really measuring in physiology is the accuracy of maintenance of organic regulation, and this is something very different from what the physicist or chemist is engaged in measuring.

* Delivered before the Edinburgh Branch of the British Medical Association, March 4th, 1921.

Regulation of the Reaction of Arterial Blood.

Now, when carbon dioxide goes into solution in water it acts as an acid, though a very weak or feebly ionized one. Hence its old name, carbonic acid. Since an investigation by Walter, from Schmiedeberg's laboratory, in 1877, it has been known that in poisoning by dilute acids the breathing is greatly increased, and that accompanying the increased breathing there is greatly increased excretion of ammonia in the urine. It appeared, also, that the increased formation of ammonia in the body was a compensatory process, tending to neutralize the acid. It was the presence of a great excess of ammonia in the urine in diabetic coma that caused von Jaksch to suspect that diabetic coma is a state of acid poisoning or acidosis, and so led to the discovery that aceto-acetic and oxybutyric acids are formed within the body in large amounts in diabetic coma. Shortly after Priestley and I published our work on the alveolar air Pembrey and Beddard found that in diabetic coma the alveolar CO_2 percentage falls to less than a third of normal, but returns towards normal when the symptoms are relieved by sodium bicarbonate. This and various other pieces of evidence led us to conclude that it is probably as an acid, and in conjunction with other acids, that CO_2 acts in the regulation of breathing. But this theory was first established on a quantitative basis by the investigations of Hasselbalch of Copenhagen. He found that by taking an alkali-forming or acid-forming diet he could alter distinctly the percentage of CO_2 to which the alveolar air is regulated during rest, but that the alteration was just such as to keep the reaction or hydrogen ion concentration of the arterial blood steady in so far as the available physical and chemical methods enable us to estimate the steadiness. Putting together Hasselbalch's results and our own, we were able to conclude that the reaction of the blood is regulated with a delicacy which is almost inconceivable,[1] and which can only be followed very roughly by existing physical and chemical methods, though much more closely by the observation and interpretation of symptoms—by "diagnosis." Every normal response of the breathing to increased muscular exertion or other causes leading to increase in alveolar CO_2 percentage betokens a temporary acidosis or diminution in the blood's alkalinity. Calculation shows that a deficiency of one part by weight of ionized hydrogen in about one million million parts of blood suspends completely the activity of the respiratory centre.

Let us glance very shortly at the means by which the blood reaction is regulated. The first means is by regulation of the breathing so as to vary the amount of carbonic acid in the arterial blood. This process of regulation acts very rapidly, but, of course, cannot in the long run deal with the non-volatile acids in the blood. The temporary acidosis of muscular exertion, or the temporary alkalosis of forced breathing, is rapidly compensated approximately by variations in the breathing. Another interesting form of compensation has quite recently been demonstrated by Dodds.[2] When food is taken there is a rapid secretion of dilute HCl into the stomach, followed about an hour later by alkaline secretion into the small intestine. The gastric secretion of HCl leaves, of course, a temporary excess of alkali in the blood, and this promptly produces a quite marked compensatory rise in the alveolar CO_2 percentage, followed, about an hour later, by an equally marked fall while the alkaline secretion is being produced. A large dose of sodium bicarbonate will also produce a marked compensatory rise in the alveolar CO_2.

The second means of regulation is by varying the excretion of acid or alkali by the urine. Compared with variations in reaction of the blood, which is always slightly alkaline, the variations in reaction of normal urine are enormous. The acidity of average human urine

is mainly due to the presence in it of acid phosphate, and, as L. J. Henderson showed, large amounts of acid can be excreted as acid phosphate without the urine becoming more than slightly acid. The phosphate acts in this respect as a so-called "buffer" substance. In alkaline urine bicarbonate acts as a chief buffer substance, as was recently shown by Davies, J. B. S. Haldane, and Kennaway;[3] and in the compensatory excretion of alkaline urine which occurs when a large dose of an alkaline substance is taken, or when forced breathing is continued for some time, very large amounts of bicarbonate are contained in the urine, so that it effervesces on addition of acid. They found also that when a man breathes air containing a good deal of CO_2 the urine becomes very acid and the ammonia in it increases. The same thing, as was recently shown in Professor Meakins's wards, occurs in asthma, since the obstructed breathing causes a rise in the alveolar CO_2 percentage.

The third means of regulation is by varying the amount of ammonia discharged into the blood; and this form of regulation is seen in all cases, so far as is known, where excretion of ammonia by the kidneys is occurring normally. When dilute acids are administered, even in large doses, to men or carnivorous animals, the compensation by increased formation of ammonia and increased excretion of acid is so perfect that compensation by increase of the breathing is difficult to demonstrate; hence the most prominent ordinary symptom of acidosis is lacking. It was recently shown by J. B. S. Haldane, however, that very marked symptoms of acidosis, with great increase of the breathing, can be produced by considerable doses of a quite neutral salt, ammonium chloride.[4] The increased percentage of ammonia in the blood brings about reversal of the ordinary reaction by which, if the blood is insufficiently alkaline, ammonia is produced in the body at the expense of urea. As a result some of the ammonia of the ammonium chloride is converted into urea, leaving behind hydrochloric acid. The kidneys alone cannot deal with this acid at all completely, and soon the stock of phosphate which they require for excreting acid begins to run short. The respiratory centre is then called upon to redress the balance, and marked respiratory symptoms of acidosis are produced. This acidosis is relieved by administration of perfectly neutral sodium phosphate, which enables the kidneys to excrete much more acid. These experiments throw new light on renal acidosis, which may evidently be due partly to paralysis or impairment in the power of secreting acid urine and partly to impairment in the power of excreting ammonia, with consequent paralysis of the power of neutralizing acid with ammonia. If the diet is an acid-forming one, or if no food is taken, so that the body is living on its own tissues, there must, when the kidneys are disabled, be a tendency towards acidosis, with the well-known respiratory symptoms so often seen in Bright's disease.

Regulation of Oxygen Pressure in Arterial Blood.

Respiration has another function to perform besides regulating the reaction of the body: it regulates the concentration of free oxygen. Recent investigations have tended to show more and more clearly that this regulation is no less exact than that of the reaction, and is of still more immediate importance. Under ordinary conditions regulation of the alveolar CO_2 percentage regulates also the alveolar oxygen percentage. But if under exceptional conditions the alveolar oxygen percentage or partial pressure falls abnormally, as when air poor in oxygen, or at a low atmospheric pressure, is respired, the breathing is increased. Evidently, however, the increased breathing will rapidly reduce the partial pressure of CO_2 in the blood, and this will in its turn reduce the breathing and so mask the respiratory effects of the want of oxygen. Want of oxygen, when produced gradually, has thus comparatively little effect on the breathing. We see this in the symptoms produced in airmen at very low atmospheric pressure, in carbon monoxide poisoning, and in gradual sinking from anoxaemia in phosgene poisoning, pneumonia, and various other clinical conditions. There is no marked struggle for breath. If, on the other hand, deficiency of oxygen in the arterial blood is produced so rapidly that there is not time for CO_2 to be washed out of the respiratory centre, the effects on the breathing may be very striking. Pembrey was the first to show that Cheyne-Stokes breathing in a patient can be abolished by the administration of oxygen. Douglas and I then found that it can be produced in normal persons by conditions which permit of the comparatively rapid production of anoxaemia, followed by comparatively rapid relief. The respiratory centre is responding to the stimulus of want of oxygen; but as there is hardly any storage of free oxygen in the tissues, the fly-wheel action which exists when CO_2 is the stimulus no longer comes into play, and the respiratory centre "hunts," like an engine with a delicate governor but no fly-wheel. Cheyne-Stokes breathing is always a symptom of want of oxygen.

Since want of oxygen increases the breathing, it lowers abnormally the amount of free carbonic acid in the blood, and thus tends to produce a condition of alkalosis. This was shown recently in experiments at low atmospheric pressure in a steel chamber by Kellas, Kennaway, and myself.[5] The urine became much less acid and the ammonia in it was greatly diminished. This implied that the alkali available in the body for combination with CO_2, or so-called "alkaline reserve," was being diminished in compensation for the deficiency in CO_2. The diminution in the "alkaline reserve" of the blood had previously been noticed, and had been attributed by myself and others to the development of an acidosis calculated to increase the breathing and thus relieve the want of oxygen. In reality there was no acidosis, but only the partial compensation by the kidneys and liver of a respiratory alkalosis. Yandell Henderson and Haggard had meanwhile made some striking experiments in which they showed that during forced artificial respiration, which produces a condition of extreme alkalosis, there occurs a great and rapid compensatory fall in the "alkaline reserve" of the blood, while during exposure to a very high percentage of CO_2 there occurs, conversely, a rapid compensatory rise in the "alkaline reserve."[6] Diminished available alkali or "alkaline reserve" may thus be a sign of either alkalosis or acidosis. To interpret its actual meaning one must take into consideration all the physiological symptoms and conditions. Much confusion has arisen in recent medical and physiological literature through failure to interpret rightly a diminution in the so-called "alkaline reserve" of the blood. Diminution in "alkaline reserve" of the blood was quite wrongly identified with acidosis.

To understand physiological deficiency of oxygen or anoxaemia we must bear in mind that anoxaemia has no necessary connexion with the amount of oxygen which the blood is capable of liberating from its haemoglobin. What matters is the amount of free oxygen not combined with haemoglobin—in other words, the partial pressure of oxygen. The arterial blood of an anaemic patient, for instance, with only 40 per cent. of the normal haemoglobin, may be capable of liberating only half as much oxygen as the blood of a normal person who has been suddenly transported to a very high altitude, or who is suffering from dangerous want of oxygen during pneumonia. But the anaemic patient will probably have just as much free oxygen as usual in his arterial blood, and will thus, by bringing into play the circulatory regulation to which I shall presently refer, escape completely from anoxaemia during rest; while in the other cases the free oxygen in the arterial blood may be so seriously reduced that no circulatory compensation is possible and life is endangered.

The symptoms produced by even a comparatively slight amount of arterial anoxaemia are very serious. We can study them in their simplest form in mountain sickness. The extreme depression, nausea, headache, etc., are very striking. Accompanying these symptoms are slight cyanosis, Cheyne-Stokes breathing, and orthopnoea. Most attacks of mountain sickness as ordinarily met with in mountaineers can be recovered from without changing the altitude, since the body by increased active secretion of oxygen inwards, by compensation of the alkalosis, and by other means, ultimately triumphs over the disturbing conditions. But if the rarefaction of the air is too great the picture is a very different one: the central nervous system—in particular the respiratory centre—gradually fails, and death occurs gradually and quietly. A vicious circle has been produced and is never broken.

By accurate determinations of the percentage saturation of the haemoglobin in arterial blood, combined with close observation of symptoms and the effects of continuous addition of oxygen to the inspired air, Professor Meakins has recently thrown quite new light on

the pathology and treatment of pneumonia and other respiratory and circulatory affections.[7] A continued deficiency of even one part by weight of free oxygen in a million of the blood present in capillaries may be very dangerous.

Anoxaemia may be caused in several different ways. Of these the simplest is that in which the concentration or partial pressure of oxygen in the alveolar air is insufficient to saturate the haemoglobin. This is the case in rarefied air or air very poor in oxygen. Another cause is thickening or clogging of the lung epithelium by exudation, so that oxygen cannot pass through it into the blood as readily as usual. A typical example of this is phosgene poisoning, and in such cases striking improvement is brought about by adding oxygen continuously to the inspired air so as to raise the diffusion pressure of the alveolar oxygen. Another, and probably much more important cause clinically, was discovered by Meakins, Priestley, and myself during the war.[8] This is irregular distribution of air in the lung alveoli, owing either to shallow breathing or to irregular obstruction of bronchi. The consequence of this is that some alveoli are ventilated to an abnormal extent, while others are very imperfectly ventilated. Now the increased ventilation will remove a correspondingly increased proportion of CO_2 from the blood but cannot substantially increase the blood's charge of oxygen, since with ordinary ventilation the haemoglobin is nearly saturated. The diminished ventilation will correspondingly diminish not only the removal of CO_2 but also the absorption of oxygen. The net result is that the mixed arterial blood becomes insufficiently saturated with oxygen although its charge of CO_2 is no greater than normal. Symptoms of anoxaemia are thus produced. We found that in various forms of neurasthenia or exhaustion affecting the bulbar centres—a very common clinical condition—the depth of breathing becomes reflexly restricted with production of anoxaemia, which in acute attacks may be very severe, particularly in the recumbent position. The exaggeration of this condition in the recumbent position explains the common symptom orthopnoea. This anoxaemia can be identified clearly by the action of oxygen administration. The anoxaemia of pneumonia, bronchitis, emphysema, and ordinary cardiac cases appears to be mainly due to this irregular distribution of air in the lungs, and this accounts for the striking effects of continuous oxygen administration. It might at first sight seem that in ordinary lobar pneumonia, where the greater part of the lungs may be consolidated, arterial anoxaemia must result from a large amount of venous blood passing the lungs without being oxygenated. In reality the circulation in the consolidated parts is almost entirely blocked, as is strikingly shown in *x*-ray photographs prepared for Professor Meakins of injected lungs in pneumonia, and also by the fact that the arterial anoxaemia and accompanying symptoms disappear with oxygen administration, or as soon as the rapid shallow breathing ceases on the occurrence of the crisis, though the consolidation remains.

Beyond calling attention to the great interest and importance of the recent Edinburgh work, I shall not attempt to go into details on the subject of anoxaemia, particularly as I did so in a somewhat recent lecture published in the BRITISH MEDICAL JOURNAL.[9] I must also pass over those wonderfully beautiful processes by which the haemoglobin of the red corpuscles assists in regulating both the concentration of free oxygen and the reaction of the blood in the capillaries.

RENAL EXCRETION.

I shall now pass to the subject of renal excretion. The renal secretory structures consist essentially of the glomeruli, first part of the convoluted tubules, straight tubules, second part of the convoluted tubules, and collecting tubules. What happens in each of these parts I shall not attempt to discuss. The parts played in them by filtration, active excretion, and active re-absorption are still obscure. What I wish to speak of is the physiology of renal excretion as a whole; and recent investigation has shown that the kidneys, just like the lungs, regulate the composition of the blood, and indirectly of the whole body, with a delicacy of which in former times there was hardly even a suspicion. I have already referred to the extreme delicacy with which the kidneys help to regulate the reaction of the blood; but this is no isolated phenomenon.

REGULATION OF DIFFUSION PRESSURE OF WATER IN THE BLOOD.

The main constituent of the blood is water. If we drink water by itself when the body is already fully supplied with water, the result is that the water is promptly excreted by the kidneys. If a very large quantity of water is drunk the diuresis is correspondingly great, and the urine excreted is almost pure water, since hardly any more sodium chloride, urea, and other constituents of the blood are excreted than would be normally. Priestley and I carefully observed the concentration of the blood during profuse water diuresis, but could detect no diminution in its haemoglobin percentage.[10] It is thus evident that if there is any blood dilution due to the water, it is extremely small. By the extremely delicate electrical conductivity method, however, Priestley was able to detect a slight diminution in the concentration of salts, with a return to normal as the diuresis ceased. The slight diminution was, perhaps, partly due to passage of salts outwards from the blood into the pure water contained at first in the gut. This would have the effect of slightly increasing the diffusion pressure of water in the blood, or, to use what seems to me a wrong, though still customary, expression, of slightly diminishing the osmotic pressure of the blood. Dr. E. F. Adolph has recently investigated in my laboratory the regulation of the normal water content of the body.[11] By water-starvation it is possible to reduce by several pounds the body weight, in spite of resistance to this by diminished excretion of urine. When water is again taken freely the body weight simply goes up to its normal amount, and when this point is reached any further water taken is promptly excreted. By various other experiments with diuretic substances he has shown how persistently and accurately the water-content of the body is regulated by the kidneys during health.

REGULATION OF DIFFUSION PRESSURES OF SOLIDS IN THE BLOOD.

When we turn to the solids excreted by the kidneys we find a similar exact regulation. As Ambard has pointed out, however, we must distinguish between substances of which, as in the case of water, there is a normal threshold concentration or diffusion pressure in the blood, and substances which, so far as is yet known, are actively excreted even to their lowest concentrations in the blood. Urea, ammonia, and sulphates, for instance, seem to have either no threshold concentrations or very low ones. The blood and tissues contain usually about 0.025 per cent. of urea and 0.0005 per cent. of ammonia—about an eightieth of the percentage commonly concentrated into the urine. On the other hand, there are sharply defined normal thresholds for sodium chloride and sugar. When the percentage in the blood rises above these thresholds, even to a very minute extent, excretion by the kidneys begins, and becomes more and more vigorous the more the thresholds are exceeded; but when the percentage falls to the thresholds, excretion practically ceases. Similarly there is an amazingly sharp threshold of blood alkalinity. Below this threshold acid urine is excreted, while above it the urine is alkaline. The dividing line is defined with a delicacy of which physiologists, misled by gross mechanistic conceptions of physiological activity and by the absence of accurate measurements, had no clear conception till quite recently.

When we know what the normal kidney is continuously doing for the body we have the necessary groundwork for discovering what is happening in disease. A kidney disabled for the time by inflammation cannot perform the excretory functions just described, or can only do so feebly. The kidney may, for instance, be lamed as regards regulation of blood alkalinity or excretion of ammonia, with the result that if the diet is an average one, or if no food is taken, acidosis is produced. If the excretion of salts is interfered with and the diet is normally rich in salts, they accumulate in the blood. One result is that the diffusion pressure of water in the body is diminished; hence water, even though the kidneys are still capable of passing it, is retained in the body and dropsy is produced. Another possible result is poisoning due to abnormal proportions of salts or other substances. When we have

"diagnosed" exactly what is happening we can adopt dietetic and other measures to control the evil and tide the patient over till normal processes of recovery have had time to develop. Even though we do not yet know how each part of a normal or disabled kidney is acting, yet, if we can diagnose from the symptoms how the kidney as a whole is failing, we have sufficient data for prescribing rational treatment.

Circulatory Regulation of Blood Composition.

Let me now turn to the physiology of the circulation. All that I have already said shows how exactly the composition of the arterial blood is regulated. But in passing round the circulation the composition and temperature of the blood are constantly and very rapidly altering. We may be certain, however, that it is not for nothing that the composition and temperature of the arterial blood are kept so astoundingly steady as they are.

The most rapid and prominent alteration is in the blood's charge of O_2 and CO_2; and the change in the colour of the blood as it loses oxygen makes this alteration grossly evident to our vision. I wish now to refer to recent evidence that not only is the composition of the arterial blood accurately regulated, but also the composition of the blood as it leaves the capillaries in the different parts of the body. Physiologists have devoted far too much attention to study of the mere physics of the circulation. What is more important is its physiology—its organic regulation.

Dr. Douglas and I have been engaged for some years in investigations—greatly delayed by the war and its aftermath—on the gases of the mixed venous blood returning to the heart in man.[12] We discovered a method of investigating these gases by determining the composition of the air with which they are in equilibrium when the lungs are artificially filled with such air. The first result of these observations was to show that during complete rest the mixed venous blood is not only very steady as regards its gas content, but is considerably less venous than has hitherto been supposed. The general circulation rate during rest is faster than was formerly calculated. In my own case, for instance, a volume of blood equal to that in the whole body passes through the heart about every thirty-five seconds—about eight litres, or 1.8 gallons, of blood passing in one minute. During muscular exertion the rate is further increased, but in Dr. Douglas and myself only about in proportion to the increase of pulse rate, although the rate of oxygen consumption may be increased eight or ten times. The mixed venous blood becomes, however, far more venous than during rest, so that it may have lost about two-thirds of its oxygen content. From this fact we cannot conclude, however, that in any part of the body the blood becomes at all markedly more venous during work than during rest. It was found many years ago by Leonard Hill, in experiments on animals, that the venous blood from muscles, whether during rest or during work, has lost by far the greater part of its oxygen, but that the venous blood from the brain has lost very little. The oxygen supply to the brain is thus far more free than that to a muscle. During work the blood supply to a muscle must be enormously increased—probably twenty or thirty times—in order to meet the increased consumption of oxygen. Consequently the mixed venous blood contains a far larger proportion of this very venous blood, and this accounts for its being more venous.

A flood of new light has recently been thrown on the regulation of local circulation by the investigations of Krogh of Copenhagen.[13] It had been shown many years ago by Roy and your president, Dr. Graham Brown, that the capillary walls are contractile. Krogh found by microscopical observation of transparent muscular tissues that during rest nearly all of the capillaries are tightly closed, so that no blood, or even plasma, can pass through them. During activity, however, these closed capillaries relax and become permeable to blood, so that an enormously increased oxygen supply is at once rendered available. We can thus understand how, in spite of the increased oxygen consumption of a working muscle, its oxygen requirements can be met without appreciable lowering of the concentration of free oxygen, or alteration of the reaction, in the local blood supply.

The constancy of the oxygen and CO_2 content of the mixed venous blood during rest has the same significance as the similar constancy of the arterial blood. What it points to is that the composition of the venous blood leaving particular organs is regulated just as much as that of the arterial blood. In other words, the blood flow is so regulated as to ensure this constancy. In the brain the required concentration of free oxygen is evidently very high, and this accounts for the fact that any failure, even slight, in the aeration of the arterial blood has such serious consequences in producing nervous symptoms. It accounts, also, for the striking anatomical fact that the blood vessels supplying the brain are very large, even though the white matter of the brain may have a relatively low oxygen consumption.

I have not time to discuss in detail how the bulbar centres which regulate the action of the heart and the calibre of the larger blood vessels, as well as the breathing, react directly or indirectly in response to the chemical or thermal stimuli which consist in slight variations in the gaseous and other composition, or temperature, of the blood. Nor have I time to discuss how local blood supply responds to the local chemical stimuli through which organic regulation of the blood composition in every part of the body is maintained. I should like, however, to refer, in conclusion, to certain broad principles which seem to emerge very clearly in connexion with the recent advances which I have been describing.

Significance of Physiological Regulation.

First and foremost it seems evident that physiological regulation is not only something very real, but is also extremely delicate. It is only by exact quantitative observations that we can estimate the delicacy of regulation; but symptoms, if we interpret them rightly, give us an extremely sharp index of failure in normal regulation. I need hardly, however, speak to such an assembly as this of the paramount importance of the close observation and right interpretation of symptoms. Regulation to a normal during health implies that the living body actively maintains a normal of structure and activity in spite of ever-changing conditions of environment. From side to side of this normal the living body is constantly oscillating as the result of disturbance in the environment, and constantly tending to return as near as may be to the normal in spite of the disturbance. We can distinguish ordinary physiological disturbances, which the body can easily overcome, from the more serious disturbances which require medical or surgical treatment to assist the return to normal or something approximating to it; but apart from the fundamental assumption that it is, to use the old expression of Hippocrates, the "nature" of a living organism to maintain a normal, and to return towards it in spite of disturbance, physiology and medicine seem to me to be a mere chaos of unconnected empirical observations. It is the reality of organic regulation, and the necessity for the guiding conception of organic regulation, that stand out in the results of the investigations which I have tried to summarize. The aim of physiology, and of every branch of biology, is, as it seems to me, to render clear by experiment and observation what the normal activities and structure of a living organism are, what the deviations from them really consist in, and how the normal tends to be maintained or re-established in face of disturbance.

Biology not Biophysics and Biochemistry.

Another ideal for biology is to search out the mechanism—the physical and chemical causes—of all biological phenomena. This ideal aims at superseding the Hippocratic conception that it is the "nature" of a living organism to maintain a normal, and it represents biology as simply "biophysics" and "biochemistry." To this conception of biology the objection is that it does not enable us to understand and predict the facts. Why does the respiratory centre fail to react to increase in hydrogen ion concentration until a certain threshold value is reached, and yet react so vigorously as soon as this threshold value is exceeded to the minutest extent? Why do renal excretion and circulation behave in a similar manner? Why do reflexes adapt themselves to varying conditions, as in the case of the respiratory reflexes? Why does the body tend obstinately to maintain in every aspect of its structure and activity a certain normal? And why, from generation to generation, is this structure and activity so accurately reproduced? To these questions the mechanistic conception of life affords no answer. Yet

the phenomena which raise them are the characteristic phenomena of life. It is because of the necessity in any science of having working conceptions which correspond to observation that I must claim for biology her own working conception—that of the living organism as such. This was essentially the claim which Hippocrates was the first to put forward; and to me he appears as the father, not only of scientific medicine, but also of biology in general.

The Greek Scientific Tradition in Medicine and Biology.

It seems to me that the progress of biological investigation is and has been steadily in the direction of consolidating the Greek scientific conception which has been so closely associated with the development of medicine. The supposed mechanism of life has been steadily eluding our mental vision, while knowledge of organic regulation has been equally steadily advancing, as has been illustrated in this lecture. I have tried elsewhere to show that the mechanistic conception of life is based, not on biological observation, but on metaphysical assumptions for which there is no sound basis.[14] Without going into this controversy, however, I wish to point out that the Greek conception gives us a working hypothesis which knits existing physiological knowledge together in a way that the mechanistic theory is quite incapable of, and which suggests new and fruitful paths of investigation in every direction. It also seems to give us what may be called a working philosophy of practical medicine and surgery. We of the medical profession are not mere chemists and mechanicians. Our business is to understand organic regulation, and where necessary to assist it. We cannot pretend to understand, replace, or repair, a physical and chemical mechanism which is beyond our powers of conception, and which, in my own opinion at least, is simply not there any more than was the traditional black hat in the dark room. What we *can* do, and do more and more effectively the more we understand of organic regulation and the conditions which disturb it, is to assist in the maintenance or restoration of this regulation.

Is the Nature which we are concerned with nothing but that apparent world of matter and energy which the working conceptions of physics and chemistry present to us? If it is, then organic regulation is only an appearance which will some day be explained in physical and chemical terms. Those who have been carried away by the flood of popular materialism which has been passing over the world in recent times are ready to answer this question in the affirmative and to go back to the search for the black hat in the dark room. Well, I cannot go with them. It seems to me that there are unanswerable reasons for concluding that the black hat is not there, and that the world as interpreted by the physicists and chemists is not the objective or real world, but only an imperfect subjective interpretation of it. The aspect of Nature which Hippocrates saw in the living body, and which a doctor can hardly help seeing in his daily work, is to my mind much nearer to objective reality than the aspect which is depicted by the physical sciences. What I have been trying to show to you this evening is that deeper and truer aspect of Nature which is seen not only in Medicine, but also in every other branch of biological work.

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A SECOND volume of *Studies in the History and Method of Science*, edited by Dr. Charles Singer, is about to be issued. The first volume appeared in 1917, with a preface by Sir William Osler. The second volume contains articles by Dr. E. T. Withington, on the Asclepiadae and the priests of Asclepius; by F. J. Cole, on the history of anatomical injections; by F. C. Conybeare, on four Armenian tracts on the structure of the human body; and by Mr. Arthur Platt on Aristotle on the heart. The editor contributes two articles, the one on Greek biology and its relation to the rise of modern biology, and the other on steps leading to the invention of the first optical apparatus.

PHYSIOLOGICAL PRINCIPLES IN MIDWIFERY PRACTICE.*

BY

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THE reproductive cycle in its widest sense—from one generation to the maturity of the next—has somehow never received adequate attention from the physiologist or taken its proper place in the medical curriculum. From the purely biological aspect the only claim to the continuation of a species rests on its ability to perpetuate itself in the struggle with other species; from the medical standpoint, reproduction is as much an integral part of medicine as digestion, respiration, or the circulation. Owing, however, to the way in which medical practice and knowledge has developed, and not on logical grounds, much of what is included under the heading of the reproductive cycle has been separated off from medicine. Eugenics may be left out of account as too largely a sociological matter, but midwifery, in the modern interpretation of the term—that part of the cycle from conception to the care of the nursing mother and nursling—has been separated by practice; pediatrics and the importance of the developing child and adolescent have only recently been thrust into the foreground by a universal quickening of the consciousness of nations as to the necessity for the care of the rising generation. Perhaps as a result of the loss of its proper place in physiology and medicine the early part of the reproductive cycle—the part that counts most—has been later in acquiring the present-day tendency of medicine to study its problems from the point of view of physiology rather than pathology, and I wish to see what this may mean if applied to that portion of the reproductive cycle I have included under the term "midwifery."

I will begin by taking as an instance of what greater attention to physiological processes may do, the change in our practice as regards infant feeding, and afterwards try to apply these lessons to the management of the woman in labour. I do this because this change has influenced my own mental attitude towards labour more than anything else, and may have a like influence on others, and also because it forms an illustration of reformation along physiological lines already accomplished, and thus indicates what may be possible in the case of labour.

Formerly our attention was largely directed towards perfecting substitutes for the natural food of the baby, and great success has been obtained in adapting the milk of another mammal, so as to enable the human infant to thrive on food never intended for it. Our textbooks devoted no more than a line or two to breast-feeding. There was a pious statement that it was best for infant and mother; there was a list of contraindications and instructions as to how to disperse the milk when suckling was not carried out, and that was about all; whereas the preparation of substitutes and the modification of cow's milk and other possibilities took up pages, and even chapters, so that there is little wonder that the student, when he had blossomed out into a practitioner, was entirely ignorant of the physiology of lactation and the management of breast-feeding. No attention was given to the causes of failure to suckle and how they might be removed, or to the means of increasing mammary activity when inefficient, or to the investigation of the reasons why the baby did not thrive satisfactorily at the breast. I am indebted to Dr. Truby King—and many others with me—and to what is accomplished at the School of Mothercraft, of which he was Director during his stay in this country, for an entirely fresh idea of the possibilities of breast-feeding in difficult cases.

At any time in the school at Trebovir Road living evidence of what a few years ago would have been thought impossible may be seen in the shape of mothers who have failed in previous confinements, and mothers whose infants have been weaned for six weeks or more, successfully nursing a contented baby. The error was that our energies had been devoted to providing a substitute for the function we did not attempt to control. We were clearly on wrong

* Part of a paper read in opening a discussion at the Sheffield Medico-Chirurgical Society, February 17th, 1921.

lines, for, however successful, such substitutes could never be as good as the real thing. We should rather have studied the function of lactation and how to improve it when defective—precisely what we are now learning to do.

I would apply this lesson to the management of labour in cases of deficient uterine action, for the analogy is a close one. Our attitude up to now has been largely that of perfecting the substitute for the maternal powers—namely, the brawny biceps of the attendant exerted through the midwifery forceps—and, as in the case of artificial feeding, we have attained great success, but also along wrong lines. If there is delay owing to deficient uterine action, the one idea of the attendant is to finish off the labour by instruments, just as the one idea in deficient mammary activity was to be off with the natural feeding and on with the artificial. Suppose, therefore, we adopt the same attitude towards parturition that we have adopted towards lactation, what will it mean?

It will mean a closer study of the normal functioning of the uterus, the factors that hinder it, and of how, by the removal of such factors, the natural powers can be made effective. We will first concentrate on eliminating the indications for the artificial termination of labour and reserve the forceps for those cases in which we fail to secure natural labour. It is no more than following the same line of thought towards management of sluggish uterine action, as towards sluggish intestinal action.

Putting aside cases of complicated labour and those in which some obstructive element is present, and confining our attention to simple delay, there are certain causes which can be readily detected and remedied, such as distension of the bowel or bladder, uterine obliquity, especially that associated with pendulous abdomen, and others, such as over-distension of the uterus and early rupture of the membranes, which may be easily recognized, but not so easily remedied, as there may be other complicating factors. The conditions chiefly contributing to failure of good uterine function in cases of otherwise normal labour may be grouped under the two headings of emotion and fatigue, and I would argue that it is their prevalence, particularly among the more leisured classes, that leads to the frequency of the artificial termination of labour, and I would therefore direct attention chiefly to a consideration of how these conditions can be removed.

Taking the emotional factor to begin with, it is likely to be operative in nervous, highly-strung women, particularly in their first labour. It will be increased by dread of the unknown, by what they have heard of the trials of their acquaintances in childbirth, by the constant suggestion of the necessity of artificial aid, by such circumstances as sympathetic mothers, husbands, and friends, and the concentration of their household on the event in which they, as patients, are playing the principal part. If, as so often happens, the anticipated date is past, they may have had several disturbed nights thinking about, and looking for, the expected pains that are to usher in their time of trial. Perhaps, also, there may be domestic and other worries to add to their mental distress. Thus the frame of mind in which labour begins is often highly unfavourable to physiological parturition, and is then aggravated by the wrong type of nurse and by the arrival of the medical attendant with a bottle of chloroform and a bag of clinking instruments, with their strong suggestion of a speedy ending without further effort.

The other factor, fatigue, requires perhaps even more management, for the uterus of an exhausted woman will not function efficiently. Loss of sleep, want of food, and, most of all, the fatigue that comes of long-continued pain, are among the common causes producing exhaustion.

The practical question is how far we can expect to make labour more natural by our endeavours to remove these causes of uterine inefficiency, and in regard to this I can only give suggestions, for the subject is too wide, and my intention is rather to indicate the lines of approach to the problem than to go into details.

In the first place, the study of the individual patient and an attempt to understand her temperament and attitude of mind towards labour is obviously important. The antenatal care and observation should not be such as to increase her fears and anxieties, but should rather be directed towards reassuring her and impressing her with the idea that she is a normal woman capable of bearing her child naturally. In the case of a woman in her first pregnancy some time spent in discussing the course of labour, what is to be expected and what she can do to help herself, will not be wasted, and, should she consider herself above the usual age for a first baby and, as is often the case, have special fears, an endeavour should be made to reassure her. The choice of a nurse, too, is a matter of extreme importance; the ideal nurse is hard to find, but if discovered, is beyond price. The talkative and ignorant creature who scares her patients with stories of what has happened to other unfortunate mothers on whom she has been inflicted, or the nervous woman who is easily worried by any incident she thinks may indicate something abnormal, are especially to be avoided. Lack of confidence and over-anxiety are at once reflected in the patient, and a nervous nurse makes a nervous patient. The quiet, understanding woman who recognizes where her patient requires help, and gives a feeling of strength and confidence, will have many more cases of natural labour than the over-anxious and fussy type.

When it comes to the labour itself the advantage of institution management over home delivery is readily seen, and forms an additional argument to that advanced by Mr. Bonney in his paper on "The continued high maternal mortality of child-bearing," on account of its better provision for surgical technique, in that it avoids also many domestic annoyances and the presence of well-meaning but unneeded relations. In the conduct of the labour the object of the medical attendant should be rather that of supervision, and of a supervision that is kept as much in the background as possible. Satisfied that everything is normal, all that can must be done to suggest that the patient's powers will suffice, and that no active interference will be required. The less he is with the patient the better. But she must not be allowed to become played out. Should she bear pain badly, become restless, and lose self-control, relief must be obtained by means of morphine, or morphine and hyoscine, or other sedative, and, to my mind, the great art in the management of labour is the knowledge of how and when to give relief to the exhaustion of the uterine pain. Every practitioner may have his favourite method—twilight sleep, so called, the old-fashioned opium or chloral and bromide—but everyone engaged in midwifery practice must study his patient and by careful observation watch for the indications of fatigue and endeavour to prevent its onset. The morphine-hyoscine narcosis has this great merit, that it greatly diminishes the emotional and fatigue effects, and though it may be argued that labour in which the patient is doped with toxic drugs is less physiological than one without drugs terminated by forceps, sedative drugs are too valuable under present conditions to be dismissed in this way. All drugs that have a sedative effect also interfere to some degree with the reflexes and with physiological action, and the problem, as it appears to me at the present time, is to decide how far the obvious disadvantages of their administration compensate for their equally obvious merits.

As a rough generalization I would advocate that preference be given to artificial delivery by the forceps when the failure of the natural powers is only the overcoming of the final obstacle, the muscular resistance at the vulval outlet; and, on the other hand, to place reliance on sedative treatment when deficiency in the expulsive powers is shown when the head is still some distance above the outlet. With increasing knowledge and experience of conducting labour on physiological lines there will gradually come fewer cases of failure to effect the final expulsion.

Returning to the analogy of successful breast-feeding, we cannot but be impressed by the importance of the "atmosphere" of the institution in which it is conducted and think how a like success might be attained in parturition. In the School for Mothercraft, for instance, the anxious mother, distraught by the care of an ailing baby, comes into an atmosphere of assured success with every suggestion of failure removed. The other patients are themselves a factor in her treatment; she hears of more obstinate cases than hers, and sees well-doing infants that were in a worse plight than hers, and the whole ritual impresses her as arranged to spell success. She, in hopes of a cure, is sent for her exercise in the open air with the woman who has been successful beyond her dreams and expatiates thereon. The sisters and nurses, full of confidence in the methods, impart a like confidence to the patients, and half the battle and more is won by the spirit

of the place. It is so striking that one feels that a similar "atmosphere" in the maternity home would also be victory half gained. The patients would be carefully supervised during pregnancy, so that all cases likely to have obstructive or other abnormalities were kept apart, and the place labelled as a home or hostel for natural labour, and not called a hospital. The midwives and nurses, carefully chosen and inspired with the spirit of the place to see their patients through a natural labour, would be on their mettle to make the methods a success, and would provide the proper atmosphere in which all suggestion of failure is abolished. The medical supervision would be kept in the background, and care would only be required to see that the methods were not carried to the extreme of refusing to recognize failure and postponing forceps delivery to the detriment of mother and infant.

A scheme of this sort is merely applying lessons learnt elsewhere in medicine. It is Dr. Hurst's method at the Seale Hayne Hospital for shell shock and war neurasthenia. The man struck dumb comes to be cured into a place where the chattering patient in the next bed was dumber than ever he was, and was miraculously restored to speech, as he will be, and so is the cure wrought.

This brings us to the final consideration as to what the future of medical practice in regard to maternity work will be, and, without wishing to attempt the dangerous art of prophesy, I would indicate merely possible changes. The duty of the doctor will be, much more than in the past, the supervision and "vetting" of pregnant women, and the picking out for special management of cases where trouble is likely. The ordinary cases will more and more be left to the charge of trained midwives, medical attention being required rather for unforeseen complications, for the prevention of fatigue, and for delivery in protracted cases. I suggest that once the primary object of the medical attendant is recognized to be the securing of a normal labour, his attendance in the lying-in room is not essential, and, at any rate, need only be occasional—when summoned by the midwife, or for visits of supervision. This is necessary to avoid the strong suggestion of artificial interference which his attendance means, and because among women delivered by midwives the percentage of instrumental deliveries is low, and the reverse for those attended by doctors. I would hope that every practitioner in family practice would have a list of competent midwives, who would be reserved for the duty of attendance on labour, and not merely employed as monthly nurses, and would carry out his methods in the spirit as well as the letter.

It is perhaps rather much to hope for in this world of erring mortals, but it is something to look forward to, and when one notes the reluctance of medical practitioners to take midwifery cases, and sees advertisements of practices made attractive by the announcement that there is little or no midwifery, and recognizes at the same time the primary importance to the nation of the maternity service, the advantage of securing the best medical supervision without taking up too much time and service in attendance on normal labour seems only possible if most of that attendance be given by trained midwives. This involves rather a shifting of the medical service from the part where least essential to those parts where it is most essential: the observation of pregnancy, the study of the individual characteristics of the woman, and the determination of the best methods of management; supervising her labour merely so far as to be assured of the absence of complications, and deciding what is advisable to maintain good uterine action and to avoid fatigue, and generally being ready to answer the summons of his midwife and to act on her reports; after the labour to give much more attention to the puerperium, to lactation, and the young infant, than has been the case in the past. Doubtless the public will have a big say in any change of method, but hitherto the medical services for maternity work have never been paid for adequately, and their shortcomings are, to my mind, largely ascribable to that fact. The public has expected an expenditure of time and skill for fees that are by no means equivalent, and the tendency of the profession has been to cut the loss by shortening the duration of the labour artificially.

Perhaps these speculations as to the lines on which the maternity service will develop are wide of the mark, but I feel sure that they will tend to approach nearer to physiology, and not away from it.

THE TREATMENT OF SYPHILIS.*

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THE records we publish are the results of some investigations carried out by us in an attempt to gain more definite knowledge of the exact manner in which salvarsan—or one of its substitutes—acts in syphilis. To attain this end we have taken samples of blood before each weekly injection, a method which has afforded us a number of facts from which we have drawn certain conclusions.

It is common knowledge that when salvarsan was first introduced it was thought that one injection would cure syphilis. Further experience soon showed that several injections were required and that mercury should also be given. Such is the position to-day, but although potent arsenical drugs have been in common use for ten years, there is no general agreement as to what amounts of these remedies should be employed or over what time the treatment should be continued.

Curiously enough the first patient treated with salvarsan in the skin department of Middlesex Hospital in 1910 was cured by one injection of 0.6 gram of the original preparation, although the form of malignant syphilis from which he suffered had resisted all other remedies. As he was kept under observation for four years the belief in the reality of his cure seems justified. But such a result is unique in our experience. Indeed, considerable amounts of an arsenical compound and mercury may be given and yet failure result. These failures have tended to throw some doubt upon the efficacy of this form of treatment; but one must bear in mind that failure may be due not only to a defect in a remedy, but also to the manner in which an effective remedy is used.

TABLE I.—*Cases of Secondary Syphilis.*

	Intravenous N.A.B. (No. of Injections).	Total Amount (Grams).	No. of Mercury Injections, each 1 Grain.	Wassermann Reaction.
No. 63 ...	6	2.7	17	Positive 13 months after end of course.
No. 68 ...	7	3.75	24	Positive 7 months after end of course.
No. 144 ...	12	10.2	13	Positive after 6 months.
No. 164 ...	10	6.0	14	Positive at end of course.
No. 190 ...	6	3.6	24	Positive after 1 year.
No. 32: Course 1	6	3.4	32	Suspicious at end of course.
Course 2*	6	5.4	29	Two months after this negative; 6 months later positive.

* Directly after Course 1, because of suspicious Wassermann reaction.

In Table I six such cases are shown. It should be noted that all were in the secondary stage—a peculiarly favourable period; that considerable amounts of novarsenobenzol and mercury had been given; and that in every case the Wassermann reaction ultimately became positive. In No. 32 actually two separate courses were undertaken. To save repetition it may be stated here that the arsenical preparation used in all cases reported in this paper was novarsenobenzol Billon (N.A.B.) administered by the intravenous route.

This type of treatment is thus open to criticism—although it is a form commonly followed—and should be replaced by some other. Either larger doses of N.A.B. should be used, or more numerous injections given, or both. These questions received consideration when Dr. Pringle took charge of the department in 1917, and he formulated a scheme which has been adopted. It is as follows: ten intravenous injections of N.A.B. are given at

* An address to the Essex Branch of the British Medical Association on September 23rd, 1920.

intervals of a week, the first of 0.6 gram, the remaining nine of 0.9 gram—in all 8.7 grams. With each an intramuscular injection of mercury is also given. While these doses may appear large they have but rarely been found excessive, and as they have now been used in a large number of cases, sufficient experience to form a judgement has been obtained. There are cases, but such are exceptional, where some modification is desirable, the reasons for which need not be particularized as they will be evident to any practitioner.

The results of such a series of injections on the Wassermann test from week to week is shown in the following tables (II, III and V), arranged in accordance with the stage of disease, primary, secondary, or tertiary. All cases shown in these series were males, as it is easier to obtain weekly samples of blood from them.

TABLE II.—*Cases of Primary Syphilis.*

Reference Number.	Spirochaetes.	Course with Mercury—Weeks: 1	2	3	4	5	6	7	8	9	10	11	12
904		++	++	++	±	++	+	o	o	±	–	–	–
956	Not found	++	++	+	+	–	–	–	–				
998		++	o	++	++	A	+	o	A	–	A	A	–
1059	Present	++	++	++	++	o	++	o	o	+	–		
922	Present	–	++	±	±	±	–	–	–	–	–		
913		–	±	–	–	–	–	o	A	–	–	–	
908	Present	–	o	–	±	–	–	–					
981		–	o	++	o	+	–	–	–	–	–		
1060	Present	–	–	–	–	o	–	o	–	–	–		
1034	Present	–	–	–	–	–	A	–					
		Course without Mercury.											
1061		++	++	++	o	++	o	++	+	–	–		
1079		++	++	++	+	–	–	–	–	–	A	–	
1070	Not found	–	++	o	–	–	o	o	A	–	–		
1124	Not found	–	++	–	–	–	–	–	–	–	–		
1133		–	+	±	–	–	–	–	–	–	–		

The symbols used in this table and in Tables III and V are to be interpreted as follows:

++ = Wassermann reaction strongly positive.
+ = Wassermann reaction weakly positive.
± = Wassermann reaction suspicious.
– = Wassermann reaction negative.
A = Absent from treatment.
o = No sample of blood taken.

It is evident that the use of mercury simultaneously with the N.A.B. introduces a confusing element; we have therefore included a second series where no mercury was given during the ten injections, in order to obtain clearer evidence of the results of the salvarsan injections alone.

Examination of the above table shows, as is well known, that in primary syphilis the Wassermann reaction may be positive or negative. But it shows a further and important fact, that in the 9 cases where it was negative to begin with, in 7 of these it became positive or suspicious, although the patient was under treatment. Had not the weekly test been made, this would have escaped observation.

It is, of course, well known that the excision of the chancre does not prevent the subsequent progress of disease in *untreated* primary syphilis, but our investigations represent a different aspect of the problem. It has been held by many that, if treatment be immediately instituted in primary syphilis while the Wassermann reaction is negative, this prevents the development of a positive phase, and on this assumption it has been concluded that primary syphilis with negative Wassermann reaction is a much more favourable state than primary syphilis with positive reaction. The investigation of the disease week by week shows that despite treatment a positive reaction develops, therefore no distinction should be made between the two classes. Indeed, in two cases where the initial reaction was negative, the subsequent positive phase was discovered to persist longer than in a case where the initial reaction was positive—for example, 922 and 981, as compared with 956. It has been suggested by a critic that some of the reactions correspond to a provocative response. These are, however, not cases of latent but of active syphilis, and therefore it would seem more correct to regard this appearance of a positive Wassermann reaction as evidence of progress of the disease.

There is a further point to which attention should be directed: in no case can the response to treatment be foretold from the type of chancre. Thus cases No. 1,059 and No. 1,060 were identical as regards date of infection and type of sore, and yet the reaction to treatment was completely different. Conversely, different types react as regards the Wassermann reaction in the same manner.

A comparison of the series treated with N.A.B. *plus* mercury with those treated by N.A.B. alone shows no marked difference. In the former, in two cases a negative response did not appear before the tenth week (904 and 1,059); in the latter the longest positive phase is represented by 1,061, the reaction remaining positive until the eighth week. The number of cases is not sufficiently large to admit of any dogmatic assertion, but so far as they go they show no distinct advantage in one method over the other.

The condition of the blood has been ascertained in six primary cases at periods of from six to eight months after commencement of treatment; all were negative.

TABLE III.—*Cases of Secondary Syphilis.*

Reference Number.	Course with Mercury—Weeks: 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
777	++	++	+	++	++	+	–	–	±	A	A	+[1]			
793	++	++	++	++	++	+	±	–	–	–					
794	++	++	++	++	++	A	++	++	++	–	A	++[2]			
829	++	++	++	++	++	++	A	±	±	–	–				
831	++	++	+	–	–	A	–	–	A	–	–	–			
833	++	A	A	++	++	A	++	++	++	++	A	++	±	–	
837	++	++	++	++	++	++	++	±	+	+	–	–			
838	++	++	++	±	++	±	–	–	–	–					
856	++	o	A	++	++	o	++	±	A	+	A	–	A	±	±[3]
1019	++	++	++	++	+	–	A	A	A	A	A	–			
854	–	o	++	±	–	–	–	–	–	–					
900	++	++	++	++	A	++	++	±	–	–	–				
959	++	++	++	o	++	++	±	–	–	–					
986	++	++	++	++	++	±	±	±	–	–					
982	++	+	–	++	+	–	–	–	–	–					
992	++	++	A	++	++	++[4]	±	–	–						
996	±	–	–	–	–	–	A	–	–	–	–				
1009	++	++	++	++	++	±	–	–	–	–					
1024	++	++	+	±	–	–	–	[5]							
	Course without Mercury.														
1048	++	++	++	++	++	++	o	++	–	–					
1067	++	o	++	++	++	++	o	A	–	–	–				
1083	++	++	++	++	++	+	+	A	–	–	–				
1087	++	++	++	++	++	++	++	++	++	+	±	–			
1113	++	o	o	++	o	++	++	++	++	++	++	–			
1135	++	++	++	++	++	++	++	++	++	–					
1148	++	++	o	o	o	–	–								
1119	++	++	++	++	++	A	++	–	±	–	[5]				
1116	++	++	++	++	++	++	+	A	–	–	A	A	–		
1157	++	++	++	+	–										

[1] Wassermann reection negative six months later.
[2] Wassermann reaction negative eight months later.
[3] Patient ceased to attend.
[4] Patient absent for eight weeks at this stage.
[5] Treatment with N.A.B. discontinued as precautionary measure in consequence of slight erythema.

Table III is compiled in a manner similar to Table II, but here all the cases represent the secondary stage. As in the previous group two series are included, one where mercury and N.A.B. were combined, and a second where

N.A.B. alone was given. A favourable response to treatment is still found. In three cases 12 injections were given, in one 11, in one 9, in one 8, and in two 7; the remainder received 10 injections. No. 831 is an example of severe and extensive involvement of skin and throat, where the negative reaction appeared after the third injection. Thus in the secondary, as in the primary phase, the clinical manifestations alone furnish no information as to the rate of progress under treatment as judged by the change in the Wassermann reaction.

A more general examination of this table shows that a favourable response occurs somewhat earlier in the first series. The actual findings are brought together in Table IV, which indicates that there is some slight advantage in the plan of administering mercury and salvarsan together.

TABLE IV.—*Effect of Treatment in Cases of Secondary Syphilis.*

In patients who received treatment by *Arsenic and Mercury* the Wassermann reaction first become negative as follows:

After 1 injection in	1 case
,, 3 injections in	2 cases
,, 4 ,, ,, ...	2 ,,
,, 5 ,, ,, ...	1 case
,, 6 ,, ,, ...	3 cases
,, 7 ,, ,, ...	3 ,,
,, 8 ,, ,, ...	4 ,,
,, 9 ,, ,, ...	1 case
,, 10 ,, ,, ...	1 ,,
	18

In patients treated by *Arsenic only* the Wassermann reaction first became negative as follows:

After 4 injections in	1 case
,, 5 ,, ,, ...	1 ,,
,, 6 ,, ,, ...	1 ,,
,, 7 ,, ,, ...	3 cases
,, 8 ,, ,, ...	1 case
,, 9 ,, ,, ...	1 ,,
,, 11 ,, ,, ...	2 cases
	10

As compared with primary cases the negative reaction appears more slowly, but is still obtained. In Case No. 854 the Wassermann reaction was found to be negative at first, although a well-marked skin eruption was present. One other case, No. 829, demands comment. This is an example of a second infection occurring while the patient was still under treatment for a previous infection. He first came under our observation with a chancre on the abdomen and his progress during the series of N.A.B. injections is indicated in the table. Subsequent treatment with mercury was continued for one year when he again developed a chancre, this time on the penis. That this was not a relapse is shown by the following facts: The first chancre was upon the abdomen, the second on the penis, and there was a history of exposure four weeks prior to its appearance. Abundant spirochaetes were present in the second chancre. The Wassermann reaction was negative at periods of six and nine months after the first infection. It is interesting to observe that this man had remained under treatment up to the time of his second attack, and thus acquired syphilis while saturated with mercury, and that his Wassermann reaction became positive shortly after the appearance of the second chancre. It is impossible to say whether he would have developed secondary manifestations or not, as he was put under further treatment with N.A.B. immediately.

From the facts appearing in Table III certain deductions may be drawn. It is evident that an "intensive" course limited to six injections, especially where smaller doses are used, may be insufficient. Further evidence of this is found in the number of cases so treated coming to hospital with clinical or serum relapse. Five such cases are included among the above series. There would appear, on the other hand, to be good reason for adopting the "ten" series, provided the beneficial effect is maintained by continued mercurial treatment, the nature of which will be described later. This belief is confirmed by the subsequent behaviour of the secondary infections. Investigation was made in fourteen cases at periods of from six to twelve months after commencement of treatment; all were negative. In twenty other secondary cases treated in a similar fashion, nineteen were negative and one suspicious after six months. Such evidence does not prove cure, but it demonstrates that a process of curing is taking place.

TABLE V.—*Cases of "Tertiary" Syphilis.*

Duration of Disease.	Reference Number.	Course with Mercury—Weeks: 1	2	3	4	5	6	7	8	9	10
Leucoplakia 20 years	796	++	++	++	o	++	++	++	++	++	A
Tabes 10 years ...	801	++	o	+	—	—	+	—	±	++	++
18 years	802	++	++	++	++	++	++	++	++	++	++
3 years	828	++	++	++	++	++	++	++	++	++	++
8 years	853	++	++	++	++	++	++	A	++	++	++
20 years	872	++	o	++	++	++	++	++	++	++	++
9 years	925	++	++	++	++	++	++	++	++	++	++
30 years	905	—	o	—	—	o	—	—	—	—	—
Congenital	936	—	o	—	—	—	A	—	—	—	
Tabes 15 years ...	954	—	—	—	—	—					
22 years	969	++	++	++	++	++	o	++	++	++	++
7 years	1020	++	++	++	++	++	++	++	++	++	++
Congenital	1028	—	±	—	—	—	—	—	—	—	—
Course without Mercury.											
7 years	1049	++	++	++	++	+	++	++	++	A	++
32 years	1047	++	++	++	++	++	++	++	++	++	++
Leucoplakia 20 years	1064	++	++	++	++	++	++	++	++	o	o
Gummata 10 years ...	1093	++	++	o	++	++	++	++	++	A	++
Tabes	1094	++	++	++	++	++	++	++	++	++	++
Perforating ulcer 30 years	1118	++	++	++	++	++	++	++	++	++	++
Tabes	1121	—	—	—	—	—	—	—	—	—	—
20 years	1123	++	++	++	++	++	++	++	++	++	++

Before beginning a consideration of the series of tertiary cases we should explain that we employ this term—admittedly an unsatisfactory one—because it is useful as expressing a syphilitic state of some years' duration; it denotes the hypersensitive period. As in the tables of primary and secondary disease, two separate series are included. It is, however, unnecessary to consider them apart.

The characteristic feature of this series of cases is the unaltered state of the blood reaction. The initial positivo or negative remains constant throughout. In every case shown in the table some active syphilitic manifestation existed. Thus, in No. 936, a man aged 34, interstitial keratitis and gummata of both legs were present; while the Wassermann reaction remained negative, the gummata healed rapidly under treatment. One other case may be noticed; in No. 801 a temporary negative phase occurred about the middle of the course of N.A.B. injections. Before coming under our care this man had received five injections, which may account for the unusual finding.

We have ascertained the later results in 10 cases. At periods of seven to nine months the Wassermann reaction was still positive despite the ten injections of N.A.B. and the further use of mercury up to the time the test was made.

The following general conclusion may be drawn in respect to old-standing disease. Although the symptoms which the patient presents may be relieved, treatment fails to influence the Wassermann reaction permanently. It is true that by prolonging the treatment over several years a negative Wassermann reaction may be sometimes brought about; but in our experience such an effect is not lasting.

General Observations.

Although it is not strictly within the scope of this paper, treatment is so intimately connected with diagnosis that some reference to the interpretation of the Wassermann reaction may not be untoward. It is becoming more and more common for patients to be referred by practitioners, or to come voluntarily, for a "blood test." Even the evidence of a single negative Wassermann reaction is sometimes accepted as conclusive. But the Wassermann

reaction is only one of the factors upon which diagnosis should be based. In all forms of syphilis, including the secondary, a negative Wassermann reaction may be met with. Nor is there anything in the nature of syphilis to prevent the person infected with it and having a positive Wassermann reaction from developing some other disorder—for example, psoriasis or scabies. Hence, if the syphilitic nature of any lesion of the skin or elsewhere be concluded or excluded solely on the result of a "blood test" many mistakes will be made. This consideration is not purely academic. Examples of error arising in this way have frequently come under our observation. Nor should the statement that treatment has an effect on the Wassermann reaction be allowed to pass unchallenged. Treatment has an effect upon the disease, and this is shown in the primary and secondary stages by the changing character of the reaction. In the later stages, on the other hand, treatment may alleviate or remove symptoms, but in the great majority of cases it does not cure the disease, and therefore fails to influence the reaction. These statements are borne out by the findings in the foregoing tables.

What is the meaning of such persistent positive Wassermann reactions? Are they merely the result of some habit of the tissues acquired as the result of previous infection? We believe this is not the case, but that they indicate the presence of spirochaetes. The best evidence for this belief is obtained from consideration of gummatous conditions of the skin. We know that treatment causes gummata to disappear, but we also know that the chance of subsequent relapse is considerable. But gummata are the consequence of local spirochaetosis. Here, then, the persistent Wassermann reaction is clearly associated with the continued presence of spirochaetes. In the case of disease of the skin the evidence is more obvious, because we can actually observe what happens, but consideration of facts goes to show that the above statement is equally applicable to old-standing disease of other parts of the body. The spirochaetes have acquired some property enabling them to withstand remedies capable of destroying them at an earlier period of infection. This indifference of chronic infection to remedy is common to infective processes in general, and in this syphilis only obeys a recognized pathological law.

Syphilis is but one process, whether it involve skin, mucous membrane, nerve, or other tissue, and the phenomena which go to make different diseases are largely the result of mechanical interference with function. The principles upon which treatment is based vary in accordance with the duration of infection. When infection is recent—that is, in primary and secondary syphilis—two objects are in view: cure of disease and prevention of communication to others, for at this period the disease is contagious. Therefore a severe and lengthy course of treatment should be undertaken. On the other hand, in old-standing disease only symptoms are treated, because the disease is now very difficult to cure and is no longer communicable. Therefore the form of treatment may be shorter, and repeated from time to time as circumstances demand.

In forming a comparative estimate of the value of salvarsan and mercury certain considerations should be borne in mind. In the early stages salvarsan should be used to bring the disease within the scope of mercury, which finishes the cure. Salvarsan rapidly brings about the negative phase, which is maintained by mercury. This may be interpreted as follows: Salvarsan destroys the majority of, sometimes all, the spirochaetes, and mercury kills any which may have chanced to escape. But the amount of salvarsan must be adequate. As is shown in Table III, six injections are often insufficient. Nor are small doses satisfactory; not only is the favourable effect on the Wassermann reaction often wanting under their use, but when they are employed the clinical manifestations after a period of improvement may become active again, even under treatment. The "ten" series seems largely free from these objections, and although lesser amounts have succeeded in many cases, the standard of treatment should depend upon what the average, not the favourable exception, requires.

In primary and secondary stages, then, treatment should commence with the series of ten intravenous injections of N.A.B. already outlined. There appears to be an advantage in giving mercury at the same time, but the evidence in favour of this is not conclusive (see Table IV). On the other hand, if mercury be withheld during the period of arsenical medication, opportunity is afforded for improving the condition of the teeth and mouth and thereby diminishing the chance of subsequent mercurial gingivitis, a point of practical importance, since such an occurrence may seriously interfere with subsequent treatment.

When the salvarsan course is concluded mercury is administered by the intramuscular route for three months. The condition of the Wassermann reaction is then determined. If positive, the course is repeated from the beginning. If negative, mercury, either in the form of injections or pills, is continued until two years have been completed from the commencement of treatment with suitable rests, the Wassermann reaction being investigated every three months.

Such a course is doubtless severe and prolonged. But with ordinary care and modification, if any condition demanding this arise, it can be carried out without harming or even inconveniencing the patient. When the serious results of failure are put in the balance against it, it would appear to be entirely justified. Nor should the consequence of delaying cure be forgotten. As time passes the disease becomes more fixed; therefore, if failure result from any form of treatment, the time that has passed in carrying this out may have allowed the disease to merge into an incurable state.

In the late stages in our series ten intravenous injections of N.A.B. and then three months' intramuscular mercury were given. What may subsequently be done depends upon the clinical progress of the case. In this connexion it should be remembered that in disease of the nervous system there is often a considerable latent period, up to three or four months, before improvement becomes evident. Repetition of this course is generally necessary, and this would be expected from what has already been said in reference to the Wassermann reaction.

Finally it may be added, that even in late stages of the disease active forms of medication, such as salvarsan or mercury by inunction or injection, are preferable to other methods.

SUPRAPUBIC DRAINAGE OF THE BLADDER:

THE DE PEZZER TUBE.

BY

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FOR a considerable period acute retention of urine has been relieved by puncturing the bladder with trocar and cannula. More recently a number of operations have been devised to facilitate suprapubic drainage and prevent any leakage into the pre-vesical space or upon the external abdominal wall. In certain suitable cases the insertion of the self-retaining tube invented by M. De Pezzer fulfils its purpose of draining the bladder from above the pubes without leakage or discomfort.

The bladder should be distended with at least 16 oz. of boric lotion at body temperature. An incision of about three-quarters of an inch is made just above the pubes. The sheath of the rectus is then cut; with the tip of the finger the fibres are separated and the bladder wall felt beneath. A trocar and cannula, the latter fitting a No. 28 De Pezzer tube, are then plunged through the bladder wall. The trocar is removed; the tube, guided by a stilette, is passed through the cannula into the bladder. The cannula is withdrawn and then the stilette, leaving the tube in the bladder. The end of the tube is mushroom-shaped and plugs the orifice securely, automatically flattening out with the rise of urine; moreover, the hole in the bladder is exactly equal to the size of tube, so that leakage is impossible.

After the wound has healed, usually about forty-eight hours later, a wooden stopper is inserted into the distal end of the tube and the patient is able to walk about in comfort without fear of wetting his clothes. A rubber garter round the thigh holds the tube in position. So simple and practical is this device that when the patient desires to micturate he can slip the tube from under the garter and remove the wooden stopper, thus relieving nature by the artificial means as easily as by the natural.

In order to keep the urine sweet and the tube free from mucus and phosphates, the patient should be provided with a glass syringe and instructed to wash out the bladder morning and evening with pot. permang. 1 in 8,000. Acid sodium phosphate gr. xv-xxx four times daily should be given to keep the urine acid.

The tube should be removed about once a month and replaced by a new one. This is easily done with a stilette, which straightens out the proximal end, so that it can be inserted into the bladder.

This method of drainage can only be adopted when a good distension is to be obtained and no previous operation has been performed on the bladder; under such conditions there is no danger of wounding the peritoneum when handling the trocar and cannula. Haemorrhage from the bladder wall need not be feared owing to the pressure of the tube.

When haematuria is present the operation is contra-indicated because the De Pezzer tube is readily blocked by clots.

The operation is most successfully used for cases requiring suprapubic drainage of the bladder owing to deficient excretion of urea, prior to prostatectomy. As local anaesthesia is usually sufficient, the patient undergoes a minimum of shock. Well does the urologist know that the shock of a preliminary cystotomy in cases of threatened renal failure in consequence of an enlargement of the prostate will often cause death. So simple a procedure as the insertion of the De Pezzer tube reduces the shock, and, should the kidneys recover their full function, it permits the removal of the prostate without the difficulty caused by the scarring of the abdominal wall.

In cases of carcinoma of the prostate patients find the utmost relief from this method of bladder drainage; they carry on their work and experience no discomfort apart from washing out their bladders.

ANTIMONY IN LEPROSY.

BY

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THE beneficial effects of various preparations of antimony in the treatment of lepers show that they are not confined to the colloidal preparations of the drug. I have recently had the opportunity of seeing a number of leper patients who have been treated with intravenous injections of a 2 per cent. solution of tartar emetic, whilst others have received the antimony in the form of antimonial wine in a cough mixture. One patient who suffered from muscular contraction associated with anaesthetic leprosy experienced such relief from one intravenous injection of tartar emetic that he asked for more injections to be given him. A similar request was made by some female lepers whose legs were covered with extensive ulcers requiring constant dressings. Not only did the ulcers appear to be cleaning up as a result of the intravenous injection, but the patients had experienced relief. The cost of dressings at this leper institution, which contains about 750 lepers, is about £3,000 a year.

An even more striking effect of the drug was seen in a large number of leper patients requiring cough mixture. To the usual expectorant mixture containing squills was added vin. antimonialis ♏xv to ♏xx, t.d.s. This was used as the stock mixture for leper patients, and was rather pleasant to take. Several of the patients found such relief that they continued to take the mixture containing vin. antimonialis ♏xx for some time after the cough had disappeared. From what has been observed at this asylum it would appear that the use of antimony is particularly indicated in "chest" cases.

The sodium preparation of antimony would appear to give equally promising results. At the Campbell Medical School in Calcutta Dr. Upendra Nath Brahmachari reports that some cases of leprosy seem to have much benefited under treatment with antimony given in the form of tartar emetic in 2 to 5 c.cm. doses of a 2 per cent. solution twice a week. In one case the patient had ankle-drop with marked patches of anaesthesia and leprotic nodules.

Spontaneous disappearance of the active signs of leprosy occasionally occurs in leper patients. I have recently seen such an arrest in a patient who was a partial cripple; but as a rule these spontaneous improvements are gradual, the improvement taking several weeks before all signs of active disease disappear. In the case of Sital, reported in the BRITISH MEDICAL JOURNAL for December 4th, 1920, p. 855, all the ulcers dried up in nine days or after five intramuscular injections of Oppenheimer's colloidal preparation of antimony, and, although the patient has been kept under careful observation by his district surgeon since his discharge from hospital, there has been no recurrence of the active signs of leprosy for five months. One must bear in mind, however, that, in view of the possible infectivity of insects with *Bacillus leprae*, exposure to fresh infection is not unlikely when leper patients are allowed to return to their homes. In their *Manual of Tropical Medicine*, 1919, p. 1650, Castellani and Chalmers state: "The difficulty of cultivating the germ on ordinary media is very suggestive of its being accustomed to live solely in animal tissues; while the abundance of the bacilli in the skin is also suggestive of that being the natural method of leaving the body."

It is to be regretted that a pathological laboratory is not attached to each leper asylum. Without such facilities at the institution itself, the means of ascertaining the cause of the spread of the infection and of determining the effect of treatment are very limited.

The healing of the ulcers under treatment with preparations of antimony is probably due to the bactericidal action of the drug; I have noticed a similar improvement in treating by intravenous injections of antimony patients who were suffering from a cloudy condition of the urine due to the presence of *B. coli* or the gonococcus. The immediate improvement that occurs after only one or more intravenous injections in such patients indicates a further way in which antimony may prove of value in the treatment of leper patients, many of whom develop a chronic cystitis, probably associated with paralysis of the bladder and *B. coli* infection. In such cases intramuscular injections of a colloidal preparation of manganese might well be combined with the antimony treatment, as I have sometimes recommended in the treatment of bilharzia cases.[1]

In view of the gradual breaking down of the shells of the bilharzia ova during a course of treatment with antimony, the rapid improvement of leper patients may also be due to the action of the drug on the capsule of the bacillus. In the *Medical Journal of South Africa* for July, 1917, Drs. A. J. Orenstein and Watkins-Pitchford confirm the observations of Sir Leonard Rogers as to the value of intravenous injections of tartar emetic in the destruction of crescents in subtertian malaria. In their series of cases the danger of unskilled administration of tartar emetic injections is well emphasized.

Though several other preparations of antimony are much less toxic than tartar emetic and less liable to give rise to local reaction, oscol stibium, which is now being used in at least four different leper asylums in South Africa alone, must be used with as great caution as any other preparation of antimony. Injected into the muscle, this preparation gives rise to practically no local reaction or discomfort, unlike collosol antimonial (Crookes), which often causes pyrexia and local swelling. Intravenously oscol stibium can be injected up to 12 c.cm. at least without toxic symptoms, provided the dose is gradually increased from an initial intravenous injection of 1 c.cm. In cases of leprosy oral administration of the drug may be combined with intramuscular injections, if so desired. Although I have not seen any very great advantage from intravenous injections of oscol stibium over the intramuscular injections, the best results would appear to have been obtained where the drug has been pushed until toxic symptoms, such as diarrhoea, have shown themselves. This is likely to occur after a total of 20 c.cm. has been given intramuscularly over a period of ten days.

If, however, the drug is injected outside the lumen of the vein selected for an intravenous injection or if it is injected into the deep tissues outside the muscle chosen for an intramuscular injection, a painful swelling gradually forms and a large abscess supervenes. Though one does not see the same painful swelling that occurs when a solution of tartar emetic is unskilfully injected, the abscess will have to be opened, and such mistakes should be most carefully avoided, especially in emaciated leper patients.

REFERENCE.

[1] *Lancet*, April 17th, 1920.

DR. E. STEINACH, professor of physiology in the University of Vienna, has been invited to the University of Stockholm, where he will continue his researches on the interstitial glands.

ACUTE RETENTION OF URINE COMPLICATED BY PERFORATION OF A DUODENAL ULCER.

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THE case described below presents several interesting points. It seems especially worthy of record because it affords an example of strain being the actual cause of rupture of a duodenal ulcer. An interesting question arises as to what is the best line of treatment of retention of urine under such circumstances. If I had again to deal with such complications, I would empty the bladder prior to opening the abdomen. This done, I would again do a suprapubic cystotomy on account of the general gravity of the condition and the marked urinary infection—providing ample prevesical drainage—rather than attempt any form of external urethrotomy.

Clinical History of the Case.

The patient was a man, 34 years of age, who for the past few years had had increasing difficulty in micturition, and for the past two months had noticed that his urine was very thick and offensive. There was also a history of somewhat indefinite indigestion, without, however, any vomiting, haematemesis, or melaena.

On March 25th, 1920, the patient, being unable to pass water, consulted a doctor. An attempt at catheterization proved unsuccessful, and, as it led to considerable haemorrhage from the urethra, was abandoned. The patient was sent home and advised to take a hot bath, which failed to afford any relief.

At 12.30 a.m. on the morning of March 26th, when violently straining to pass water, the patient was seized with an agonizing pain in the upper abdomen which felt as if "something had given way." When eventually the patient was able to attract attention, and medical aid was summoned, the practitioner called in discovered the patient in a collapsed condition, and almost unable to give any account of himself. The abdomen was found to be rigid and tender all over. A hypodermic injection of morphine gr. 1/3 was given, which afforded some relief. On being called to see the patient I found him in great pain, but obviously somewhat recovered from his shock.

On examination it was found that the abdomen was distended, universally rigid, and tender, the liver dullness being absent. Palpation of the bladder was impossible owing to the rigidity of the overlying muscles, but on percussion it was estimated that it reached fully an inch above the umbilicus. On consideration I came to the conclusion that in addition to retention of urine the patient was suffering from the perforation of a gastric or duodenal ulcer. He was accordingly moved at once to a nursing home. On trying to pass a catheter an impermeable stricture was found lying immediately in front of the triangular ligament. Under these circumstances it was decided to open the abdomen at once, and to deal with the bladder condition at the end of the operation.

First Operation.

A general anaesthetic was given, and a small incision was made through the lower right rectus segment, with the idea of confirming the diagnosis, and for future drainage. On opening the abdomen, free gas and a fair amount of turbid fluid was discovered, the intestines were injected, and the bladder was seen to reach above the umbilicus. No attempt was made to find the appendix. The abdomen was next opened by a second incision over the right upper rectus segment. The stomach and intestines generally were found greatly distended and the latter loaded with faecal matter. On further investigation, gas and fluid were found welling up from the region of the second part of the duodenum, where an indurated perforated ulcer could be felt. At this juncture the condition of the patient was so bad, and the difficulties of manipulation caused by the distension of the intestines and bladder so great, that it was deemed inadvisable to make any prolonged attempt at closing the perforation—a proceeding which would have been difficult under the most favourable circumstances. A large drainage tube was therefore passed to the seat of perforation, and another through the lower incision into Douglas's pouch, and after a brief attempt to cleanse the peritoneum, the abdominal cavity was closed. A suprapubic incision was next made and the bladder opened. A drainage tube was introduced and fixed in the bladder by means of a soft catgut stitch, and the suprapubic wound was partially closed. The urine was found to be phosphatic and very foul-smelling.

The patient, whose condition improved slightly when the abdomen was closed, was put back to bed in the Fowler position. Rectal salines and eserine sulphate gr. 1/50 were given every four hours. The morning after the operation the patient's condition was fair, considering the gravity of the case; but towards evening vomiting started, and for the next three days there was hiccough, absolute constipation, and gradually increasing distension.

On the fourth day the bowels were eventually opened after the administration of eserine sulphate, calomel, pituitrin, and various enemata, and the condition of the patient greatly improved. All drainage tubes discharged freely, the urine being collected from the suprapubic wound in a Hamilton-Irving apparatus. From this point onwards the abdominal condition progressed favourably, and the upper incision healed without the formation of a duodenal fistula. On the eleventh day after the operation the stitches were removed. This was at once followed by the opening up of the suprapubic wound, which discharged a large quantity of pus, the drainage of the prevesical space having evidently proved unsatisfactory. On account of the discomfort caused by the escape of urine over the excoriated skin it was decided to deal with the urethral stricture at once.

Second Operation.

Accordingly on the twelfth day after the first operation a general anaesthetic was again given. At this second operation a No. 2 (French size) bougie after considerable difficulty was passed into the bladder. This bougie was withdrawn, and an attempt made to pass the guide of Thomson Walker's urethrotome. This was, however, found impossible owing to the tip of the instrument always catching in a small crypt, or false passage. The bougie was again passed, and the guide of the urethrotome tied to it with a short length of silk. The distal end of the bougie was then caught with forceps in the bladder, through the suprapubic wound, and the guide pulled through into position. The urethrotome was attached, passed into the bladder, and the stricture divided. A No. 14 (English) metal sound was then passed, following this a No. 12 (English) gum-elastic catheter was tied into the urethra, and finally a large drainage tube was placed in the pre-vesical space.

The vesical condition gradually improved under treatment. Three weeks after the second operation, the suprapubic wound being dry and the urine free from gross infection, the patient was allowed to get up. Subsequently a No. 12 (English) sound was passed at intervals. It is gratifying to be able to add that the patient has had an uninterrupted convalescence.

Notes by E. B. TURNER, F.R.C.S.

On being called to this case, which I then saw for the first time, at 1.30 a.m., I found the patient exceedingly collapsed and suffering intense pain. The only history I could obtain at that time was one of retention of urine, becoming acute in the afternoon, and an attempt at catheterism, which failed. After this failure the patient was advised to return home and sit in a hot bath. This was done, without relief. Soon after, when straining hard, on attempting to pass water, he felt "something give way" in the abdomen, and was at once in acute agony. I found the bladder tense and distended, the abdominal walls retracted, tenderness in the epigastric region, a small weak and flickering pulse. The patient was sweating profusely, and his expression was "pinched" and anxious. I came to the conclusion that probably a duodenal ulcer had given way, and that operation as soon as possible was necessary. The bachelor flat in which the patient was living was quite unfitted for a laparotomy, and his collapsed condition precluded immediate removal. Under these circumstances I decided to break the rule which I have always observed, not to give morphine in early abdominal cases lest the symptoms be masked, and I injected that drug for two reasons: first, that by relieving the pain he might become less collapsed, and second, that if there were a perforation the paralysis of the intestinal muscles and consequent distension of the bowel might to some extent plug the perforation and hinder further leakage. At 7.30 a.m. I found him better and much less collapsed. No other change. I got Mr. Ewart to see the case, and the subsequent developments are recorded above.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

CALCIUM IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

FOR the last two years I have been giving calcium lactate to a majority of the 94 patients in the Ayrshire Sanatorium, and I am convinced of the benefit accruing. After considering certain facts as to calcium metabolism, and bearing in mind certain clinical manifestations of tuberculosis, I came to the conclusion that if calcium could be absorbed it might prove of great value in the treatment of tuberculosis.

The female loses a great deal of calcium with the menstrual blood; hence in cases of excessive ovarian activity calcium may become deficient. In many girls and young women, and in some women at the menopause

who are found to be also suffering from pulmonary tuberculosis, one of the distressing symptoms is menorrhagia; this condition can almost invariably be benefited by the administration of calcium. Calcium largely ceases to be excreted during pregnancy, the retained calcium being used up by the growing foetus; during lactation calcium is largely secreted in the milk, and this is probably the chief reason why lactation has such a prejudicial effect on tuberculous women. The high content of calcium in milk may be one of the reasons for milk holding such an important position in the dietary of the tuberculous; and therefore when milk is difficult to obtain it might be well to give children calcium. The reproductive organs seem largely responsible for calcium waste, and even in males sexual excesses are accompanied with calcium loss. I have found calcium useful in treating young adult males, and it would probably be useful in the treatment of neurasthenia.

The effects observed during the administration are as follows: Fall in temperature, cessation of night sweats (rare in a sanatorium), increase of energy, cessation of menorrhagia, retrogressive changes in the lesion, and benefit to anaemic conditions.

The drug has for the most part been given as a powder of 15 grains of the lactate every night during alternate weeks; it is quite easily taken in this way, though in a few cases it has been given in solution.

I should like to acknowledge the assistance I have received in this investigation from the works of Dr. W. Blair Bell of Liverpool.

EDWARD E. PREST, M.A., M.D.,
Medical Superintendent of the Ayrshire Sanatorium.

THE CEREBRO-SPINAL FLUID IN ENCEPHALITIS LETHARGICA.

DRS. DENYER and MORLEY (BRITISH MEDICAL JOURNAL, February 5th, 1921, p. 191) relate an interesting case of this disease, in which 10 grains of hexamine was administered intravenously. They remark: "The indications seem to point to hexamine being of value." The patient, however, died. The following case is almost identical with that related — with the exception of laryngeal spasm — and this case seemed to be so hopeless that no treatment whatever was adopted beyond cleansing the mouth and general attention. The patient, however, recovered.

C. M., aged 25 years, after a mild febrile malaise lasting five days, became drowsy and complained of headache. He was restless, refused food, and was somnolent. The following morning and throughout that day the condition remained the same, but the following night he became wildly delirious, and had to be forcibly restrained on several occasions. On the third morning he was completely unconscious; there was weakness of the right side of the face, but no definite paralysis. Both pupils were widely dilated but reacted to light, the left pupil being larger than the right. Occasionally spasmodic contractions of muscles occurred, but there was no definite rigidity, no head retraction, and all muscles were flaccid as a rule. No squint or ocular paralysis was present, no rash, cyanosis, or sweating. There was incontinence of urine and of faeces but no distension of the bladder. The urine was normal. Knee-jerks were markedly increased; Kernig's sign was slightly positive, Babinski's absent, and there was no ankle-clonus; *tache cérébrale* and abdominal reflexes were present. The spinal fluid was reported on examination by a pathologist, to be in all respects normal (after thirty-six hours' unconsciousness).

For the three following days the patient remained completely unconscious. There was mild irregular fever, and on the sixth morning consciousness gradually returned and the patient regained all his normal functions. Recovery, which took place within the next few days, was uneventful.

The fact that the cerebro-spinal fluid was normal in the early stage seems to be in accordance with the explanation offered (JOURNAL, February 19th, 1921, p. 277) in the case of four fatal cases where the *post-mortem* examination showed no histological signs characteristic of encephalitis lethargica: "The probable explanation of the negative results of examination of the brains of the fatal cases is that the course of the disease was so rapid that there was not time for the characteristic changes to appear in the central nervous system." It is, however, a matter of surprise that not only were microscopic changes absent from the brain, but that the cerebro-spinal count should remain normal for at least thirty-six hours after the supervention of complete unconsciousness, and would suggest the correctness of the clinical diagnosis to be doubtful. Since Professor MacIntosh produced a fatal lethargic illness in a monkey by means of intracerebral and intraperitoneal injection of a filtered emulsion of cerebral tissue, which did not show any histological changes but nevertheless came from a fatal case of encephalitis lethargica, the examination of the cerebro-spinal fluid in the early stages of the disease appears likely to be without any diagnostic utility.

Southsea. R. HAMER HODGES, M.B.Lond.

TRANSVERSE CERVICAL LACERATION.

A CASE very similar to those recorded by V. Heiss, and reported in the BRITISH MEDICAL JOURNAL of February 19th, 1921, in the Obstetrics and Gynaecology section of the *Epitome of Current Medical Literature*, occurred in my own practice.

On June 11th, 1918, I was sent for by a midwife to render assistance owing to "delayed labour." On examination of the patient, who was a multipara, I found that there was an obstruction to the passage of the head along the vaginal canal, caused by the protrusion through a transverse laceration of the cervix of an elongated bag of waters. The os externum was fully dilated, and the bag of waters normally presenting there had already ruptured, but the secondary bag almost completely filled the vaginal canal, thus preventing the passage of the head. On puncturing this the head rapidly came down, and the child was born within a few minutes. The cord was divided, but when the placenta was expelled it came through the tear, so that the cord had to be returned to the cervical canal before it could be delivered. The tear was stitched up and healed completely.

S. CAPLAN, M.D.Brux., M.R.C.S., L.R.C.P.
London, W.

Reports of Societies.

ERADICATION OF TUBERCULOSIS IN MAN AND ANIMALS.

A COMBINED meeting of the Royal Society of Medicine and the Central Branch of the National Veterinary Medical Association was held, under the chairmanship of Sir JOHN BLAND-SUTTON, on March 14th, to discuss "The eradication of tuberculosis in man and animals." The meeting was consequent upon a previous one held on February 3rd, when the more general subject of "Diseases of animals communicable to man" was the subject of an address by Professor Hobday (BRITISH MEDICAL JOURNAL, March 5th, 1921, page 351).

Bovine Tuberculosis.

Sir JOHN MCFADYEAN, in opening, said that no one could accuse veterinary surgeons of neglecting the subject of communicable diseases. To a certain extent it had become almost threadbare, and some aspects were not always presented in quite the right perspective. It was true that the diseases of animals which were transmissible to man formed a considerable list, but, apart from tuberculosis, the cases of actual transmission of these diseases in this country were about as frequent as the occurrence of deaths from lightning in summer. If all the cases occurring in this country of transmitted disease were divided equally among all the veterinary surgeons, each surgeon would only have to do with one case in three years, or, in certain of the diseases, one in ten years. Where, then, was the proposed specialist in transmissible diseases to find his material? Tuberculosis, however, was in a different category altogether. It was a disease met with in all the domesticated species, mammalian and avian, though it was now generally agreed that the avian was a distinct disease, and was transmitted rarely, if ever, to human beings. For veterinary surgeons the question almost entirely was that of bovine tuberculosis; only a very small proportion of cases of tuberculosis met with in veterinary practice were distributed among other species. Bovine tuberculosis was an independent disease. The eradication of tuberculosis from the human race, and from all species of domesticated animals other than bovine, would, as far as one could see, still leave the incidence of bovine tuberculosis absolutely unaffected. On the other hand, the eradication of tuberculosis from cattle would

reduce almost to vanishing point the cases of tuberculosis met with in other domesticated species, and would appreciably reduce the incidence of tuberculosis in man. It was impossible to say what was the percentage of tuberculosis among young bovine animals up to the age of 2 years; slaughterhouse statistics and records of tuberculin testing on a sufficient scale were lacking. But there was evidence to show that the incidence was not high in young animals. It rose with age, and became serious only in animals over 2 years old. Among adult cattle the proportion affected was not less than 30 per cent.; he believed it to be higher. The eradication of tuberculosis from the cattle of this country was only possible if it could be carried out regardless of cost. It would involve the compulsory tuberculin testing of all cattle and the slaughter of the animals which reacted. That would mean the slaughter of from 750,000 to a million cows or heifers. No Government would find the money to compensate for such a slaughter, and even if it did take place the result would be so to reduce the milk supply as to drive up the price to an impossible figure. If instead of slaughtering all the affected animals they were placed in isolation such isolation would have to be permanent, otherwise the disease would not be eradicated, and it would extend from animals known to be affected to animals which had been put aside provisionally. But the owners of valuable pedigree herds might do a great deal towards the eradication of tuberculosis from the herd. Most of them were wealthy men, and had facilities which made eradication a possible policy. The Research Institute in Animal Pathology at the Royal Veterinary College had recently made an offer to the owners of any pedigree herds in this country to lend free assistance, including the supply of tuberculin, and some few very valuable herds had already been placed in the hands of the Institute. If wholesale measures of eradication were impossible, a more moderate measure to prevent the infection of human beings might be taken by reviving the Tuberculosis Order, which was introduced in 1913 and suspended on the outbreak of the war, to cut off the supply of milk from cows with tuberculosis of the udder and from other cows that presumably were passing tubercle bacilli. The infection through meat had no doubt been immensely exaggerated in the past; milk was the chief avenue of infection, and accordingly he proposed:

> That the Fellows of the Royal Society of Medicine and the Central Branch of the National Veterinary Medical Association, assembled in joint meeting, are of opinion that the prevalence of tuberculosis among cattle in this country continues to be a serious menace to the health of human beings, and that to counteract this danger the reintroduction of the Tuberculosis Order, which was suspended in 1914, is urgently required.

The Milk Problem.

Professor LYLE CUMMINS (Cardiff), who seconded the motion, referred to the great amount of patient research being carried on by Dr. Stanley Griffiths and other workers, and he had no doubt that in the course of time much more would be known about the actual importance of bovine infection to man. It could be said for certain that bovine infection gave rise frequently, in children at any rate, to meningitis. A large amount of abdominal tuberculosis was due to the same cause. But, taking the whole pool of human tuberculosis in England, what really counted was phthisis, and in this connexion he recalled the interesting light thrown on phthisis by Dr. Brownlee in his recent statistical investigation, which showed that throughout Great Britain there were two types of mortality—a young adult type and a middle-aged type; and that while the young adult type led to a preponderance of deaths in certain areas, chiefly great scattered areas, it was the middle-aged type of death chiefly which obtained in London and other great aggregations of population. The young adult type appeared not to be correlated in any way with milk, whereas the distribution of infected milk appeared to be definitely linked up with the middle-aged type of death. This circumstance did suggest that, although death eventually occurred, the total period of the disease was prolonged in the class of cases in which milk infection might be concerned, so that there must be some influence as a whole favourable to the people where the tuberculosis terminated in the middle-aged type of mortality as compared with the people who died rapidly of the young-adult type. Some of that prolongation of the effects of tuberculous infection might possibly be due to a partial vaccination by a bovine strain. He knew that this was dangerous ground, but such a vaccination was very plausible and seemed to cover a great many of the facts. On the other hand, he would regard the advocacy of such vaccination as entirely unjustifiable, because this vaccination, even if it existed, could not be controlled. He could not free his mind from feeling that it did exist, and played a very important part in the great diminution of fatal phthisis which had taken place in recent years; but to advocate it was a different thing, for the knowledge of it was not yet established, and, even if it were, it would have to be admitted that milk as a vaccine could not be controlled as regards dose. The only policy, therefore, was to better the milk supply and diminish infection. The means of transportation and distribution of milk were extremely uneconomic. This essential nutriment was sent over the country in very dilute form. The volume of milk in proportion to its nourishing qualities was large. It was a matter for the physiologist to tell them whether, without depriving children of necessary vitamins, the bulk of milk might be diminished by drying processes, and yet the risk of producing deficiency disease be negligible. This voluminous and difficult material was liable always to contamination by other germs in transit, and if it could be diminished in volume, without losing any physiological essential, a purer milk supply would be assured. Here again, however, our knowledge was not yet complete.

A Plea for Comparative Pathology.

Sir CLIFFORD ALLBUTT said that he would be only wasting the time of the meeting if he were to enter upon the large field of tuberculosis in the endeavour to illustrate or enlarge that subject. Moreover, those present had heard technical addresses, and would hear yet others, dealing with these matters in an intimate way which he, on this occasion, did not propose to follow. He would take another line—a paradoxical line—by asking: What was the good which tuberculosis had done for the human race? Had not tuberculosis brought certain benefits to mankind? He remembered in his early days, when he began practice in Yorkshire, that the Yorkshire dales—those long valleys of the Wharfe and the Swale and the Don—were full of enteric fever, which was endemic in those places. It was looked upon either as a kind of visitation from God or as something in the atmosphere, in any case wholly outside human interference. So things went on until the appearance of the excellent work which was done upon the enteric bacillus, and thereby some notion of the way in which disease arrived and might be met got driven into the minds of the people. Before that time—and often, he regretted to say, since that time—the farmsteads in those valleys were centres of stench, and vermin, and disease, and one might as well have talked to one of his own bullocks as to the farmer on the way in which disease arose in those places and how it might be counteracted. The same was true of the squire; he was just as stubborn as the rest. And in that respect the enteric fever brought with it this benefit, that it did have the effect of informing the people as to the causation of disease. It was useful to consider in what respect tuberculosis had done something of the same kind. Koch's discovery of the tubercle bacillus in 1882 was like a stone cast into a stagnant pool. People began to realize in what way disease was bred amongst them—that it was due to a living virus which it was for them to discover and counteract. In that way a great piece of education was carried right among the people by tuberculosis. The thing was taught even to the babes and sucklings—to such innocents, for example, as the butcher and the milkman. Even these people were obliged to become, in a sense, scientific. Only recently, to take another example, the world had been made aware of the wonderful results obtained in the case of glanders by the veterinary schools in the war. Glanders was diminished—he might almost say obliterated—and the work with mallein was seen by every stable boy. That was the first lesson. These schoolmasters chastized us with scorpions, but they also instructed us. The second lesson was that if a successful campaign against these diseases was to be undertaken it must be a long and slow and laborious business. That was what the public even

now would not see. The public would bestow a relatively small sum for investigation and ask for results in three months. Tuberculosis was teaching the public, however, that the investigation of any one of these diseases, or even parts of any one of them, must be long, slow, and extremely expensive. In the growing of crops it was necessary first to clear the ground, and then to plough and harrow, which took a long time; and even after the seed had been cast it lay apparently dead for months before the blade appeared. Not less patient must be the investigation of disease. It was a long and costly process, and the public must learn that means had to be provided for its continuance, while the men who were engaged upon this enormously difficult question must also recognize that it would take a long time, and they must work with faith and hope, sure that the results would come some day, though they could not say when. The third lesson was this: that if these great questions were to be understood—and they were confining themselves to the question of immediate pathology, of tuberculosis among other diseases—there must be a combination of forces. The large principles of disease would never be determined until there was a system of comparative pathology, with establishments of various kinds for its study on a large and sufficient scale. At present the work was being done, though with very great success, in departments which were almost isolated. Good work had been done alike by the entomologists, and in the veterinary schools and in human medicine, but all were working in their independent ways. So far as he knew, pathology was the only subject which had hitherto declined to call—or at any rate had been supine in calling—the comparative method to its aid. Anatomy could not live without comparative anatomy. Law made use largely of comparative history; the study of religion, of philology—wherever one looked, the same comparative method was followed. None of these subjects could have attained its present position without comparative study. The establishment of the study of comparative pathology, and the linking together of the several departments, would greatly aid and encourage investigation, and would counteract the tendency to extreme specialism; there must be specialism, of course, but it need not involve isolation.

Sir Clifford Allbutt went on to say that he was sanguine enough to believe that, with the presence of distinguished veterinarians at the Royal Society of Medicine that evening, they had the beginning of a comparative pathology. They had heard what Sir John McFadyean had said; they had recently had placed in their hands a new edition of the work on pathology by Major-General Smith, and they knew the admirable work done by Professor Hobday and others, as exemplified in the *Journal of Comparative Pathology* and elsewhere. Mr. Scott of Bridgwater and others were working hard at the establishment of a systematic study of pathology, embracing more than their own subjects. On his (the medical) side he was afraid the links were few; one of the strongest was the chairman of the evening (Sir John Bland-Sutton). As Professor Stanley Gardiner had remarked the other day, millions of the best of our race owed their lives to the labours of forgotten men of science who laid the foundations of our knowledge of the generations of insects and flat worms, the modes of life of lice and ticks, and the physiology of such lowly creatures as the amoeba, leading up to the parasites of malaria, typhus, dysentery, and so on. All that knowledge thus acquired would bear its best fruit in the field of comparative pathology. Who was not astonished to read in the newspapers recently that even herrings depended on sun spots? The whole doctrine of evolution was comparatively recent and had not yet come into pathology as it ought to have done. He was thankful that the veterinary profession had come to their support that evening. While there could, of course, be no fusion, co-operation in common work was feasible, and this should obtain, not merely between human and veterinary medicine, but between entomologists also, and workers in the whole field of animals and plants. That must be largely the work of the universities. He was not entitled to speak for any other university than his own, but at Cambridge they would never think of establishing a veterinary school. The practical work must be learned in special large centres. He did not know what might be the position in the northern universities, but neither Oxford nor Cambridge was so placed as to be able to have—even if it ought to have, which he did not believe—a veterinary school. It was, however, the business of the universities to establish schools of comparative pathology on those broader and more abstract lines, while the actual work for the professions might continue to be done in the large centres. Veterinarians had their own school, and had, and always would have, their one portal. But it was the business of the universities to link up, if possible, all these various practical fields, and to teach the application of certain broad scientific principles. It was these three lessons which, he ventured to think, tuberculosis had helped to teach mankind, and to that extent it had benefited the race. He was very glad to hear the other day that a committee for comparative pathology had been started, and that Sir David Prain was to be the chairman. That showed, at any rate, a desire that it should be on the broadest lines of comparative work, which included work on plants, for they must remember that when they were speaking of the pathology of enteric fever and similar diseases they were speaking of plants and of unicellular plants, which had so vast an influence over the destinies of mankind.

Dr. A. C. INMAN said that an immense amount of patient and careful work had been done since Koch's discovery to establish the extent to which the bovine type of bacillus infected man, and which type, human or bovine, was the more important in human disease. On taking cultures from all types of tuberculous disease in man it had been found that the bovine infections for all ages worked out at 18.7 per cent. of the total number of cases. But on analyzing these forms of tuberculous infection in man great differences were found. In phthisis, taking all ages, the percentage of bovine infection was only 1.4, while cultures made from tuberculous glands in the neck in young children during the first five years of life showed the bovine infection in 85.7 per cent., and between the ages of 5 and 10 in 65 per cent. The bovine infection, therefore, was a reality, and great precautions must be taken about the consumption of infected foodstuffs. Unhappily, in the case of tuberculous infection, there was not, as yet, any certain means of diagnosing the disease at an early stage. Some test was wanted whereby the disease could be diagnosed before bacilli appeared in the sputum.

Dr. HALLIDAY SUTHERLAND argued for agreement upon certain general principles. After Koch's discovery, right up to the present time, nine people out of ten when asked what was the cause of tuberculosis would reply, "The tubercle bacillus." Philosophically, that was wrong. Tuberculosis was the result of the bacillus on the one hand and of a lack of resistance of the body on the other. The fighting bulls of Spain were free from tuberculosis because they led a life in the open. Tuberculosis was an expression of an imperfect civilization. Apart from the discovery of a definite specific, like "606" for syphilis, all their efforts would be only partially successful until the resistance of the race was improved and man was made to lead a healthy life. The idea that any good would be got from tuberculous milk as a means of vaccination seemed dangerous. It might be uttered in a medical meeting without doing any injury, but it would be taken up by dairy farmers and agricultural papers and used as an argument against doing anything in the matter of tuberculous milk. If there was anything in this vaccination, let all children be vaccinated with cultures of tubercle bacilli, but first let the results of protective inoculation both of cattle and guinea-pigs be called for; so far these results had failed to warrant the application of that theory to man. He thought it dangerous to rely upon laboratory diagnosis in medicine. While nothing was perfect, they had at present in clinical methods of percussion and auscultation, verified by *x*-ray examination and the tuberculin test, a good working technique whereby tuberculosis might be diagnosed at least two years before the bacillus appeared in the sputum.

Professor F. HOBDAY said that workers in human and veterinary medicine covered much ground in common, and by working in unison better results would be obtained than if each side kept within a watertight compartment.

Sir JOHN MCFADYEAN, in replying to the discussion, said that the incidence of tuberculosis at different ages in man could be explained without assuming that milk from tuberculous cows was an important factor at all. He denied

that Spanish bulls of the ring were free from tuberculosis, and he knew that tuberculosis might occur to a somewhat serious degree among ranch cattle which had never been under a roof.

The resolution calling for the reintroduction of the Tuberculosis Order was carried unanimously.

THE NON-OPERATIVE TREATMENT OF SURGICAL TUBERCULOSIS.

AT the meeting of the Medical Society of London on March 14th, with Sir WILLIAM HALE-WHITE, the President, in the chair, a discussion took place on the non-operative treatment of surgical tuberculosis. The opening paper was read by Sir HENRY GAUVAIN, medical superintendent of the Lord Mayor Treloar Cripples' Hospital and College, Alton, Hants. He said that he would confine himself to tuberculous disease of the bones, joints, and glands, in which conditions non-operative treatment might now be usually adopted with confidence and a reasonable assurance of success. In certain other non-pulmonary tuberculous lesions—for instance of the kidney—operative interference still had an essential field, but in such situations as the meninges of the brain treatment of any sort remained almost futile. Operative treatment of an active tuberculous lesion was based on a false pathology, except when the lesion occurred in a situation where its presence was incompatible with life. Lannelongue showed that the progressive extension of a tuberculous abscess towards the skin was not a mechanical phenomenon, but was the result of primary infection and subsequent excentric destruction of tissues by tuberculous elements advancing in the manner of a neoplasm. Hence was evolved a radical treatment which had arrived at the total extirpation of tuberculous tissues, but this practice, possible and efficacious with small tuberculous foci, exposed the patient to serious danger when applied to extensive bony lesions. The mortality, both immediate and indirect, after major operations was appallingly high, and in the survivors, especially growing children, the extensive mutilations gave deplorable orthopaedic results.

To the "tuberculome" theory the conservative surgeon opposed a theory based on the defensive resources of the patient. A tuberculous lesion provoked a reaction, there was the formation of a zone of resistance about the focus of the disease by the formation of fibrous tissue which encysted, limited, and tended to prevent the progress of invasion. Thus the issue was the result of two opposing forces—the disease which attacked the organism and the reaction which this attack provoked. It appeared reasonable to reinforce this natural defence and diminish the virulence of the attack of the bacillus, limiting in this way its progress. To this day there was too great a tendency to concentrate unduly on the local lesion, and to disregard the fact that the patient himself had contracted a general disease, of which any particular lesion or lesions were merely local manifestations.

The title "non-operative treatment" of surgical tuberculosis conveyed no suggestion as to what the treatment, if non-operative, might be. Treatment, where operation was avoided in these conditions, was usually termed conservative, but that term again was open to criticism. He defined conservative treatment in surgical tuberculosis as the adoption of all measures tending to improve the patient's general health, to increase his powers of resistance to tuberculous disease, and to preserve or restore the part or parts attacked, in contradistinction to radical treatment, which aimed at the cure of the disease by the removal of the local lesion. Such a definition was the very antithesis to lack of treatment; it necessitated very active, numerous, and complicated methods being employed, and implied that surgical procedures were by no means necessarily excluded. Chronic disease, which of necessity involved lengthy treatment, had for too long been regarded from the purely pathological point of view, the intellectual and industrial aspect of the problem having been ignored. This state of affairs should have been remedied long ago. All child patients should be educated, and manual instruction should play a large part in the scheme; adolescents should be trained in work suited to their limitations, and adults occupied. To assist in carrying out that part of the work, on the educational side fourteen trained teachers, and on the technical five trained instructors, were employed at Alton. Sir Henry Gauvain advocated the establishment of properly equipped "preventoria" where such children could have preventive treatment under the best climatic, hygienic, dietetic, and educational conditions, and under skilled supervision. Such a preventorium was in contemplation at Alton.

A detailed description of conservative treatment would include consideration of general treatment, involving climatic, hygienic, dietetic, drug, educational, and other methods; and local treatment, which was concerned with the correction or prevention of deformity and was largely orthopaedic in character, but was subject to those limitations which the fact that the patient was tuberculous enjoined. Under the latter heading might also be included surgical measures, which had still a place, such as the aspiration of tuberculous abscesses of bony origin. Adjuvant methods of treatment, including heliotherapy, balneotherapy, chemiotherapy, vaccine treatment, and the therapeutic employment of x rays and other electrical agents, represented perhaps the most interesting advances made in the non-operative treatment of surgical tuberculosis. Auxiliary methods were of importance for the patient's general well-being, and comprised attention to the teeth, skin, throat, nose, ears, and eyes. Included also under auxiliary methods was a branch institution where chronic cases not requiring any special treatment might be detained indefinitely, and thus give room at the hospital for more acute patients urgently needing specialized care. In regard to after-care, all patients who had suffered from surgical tuberculosis should have the continued advantage of occasional skilled supervision, and no special hospital for the treatment of these conditions could be considered complete unless it possessed an out-patient department where discharged patients might be periodically examined, advised, and assisted. Not only was medical help required, but advice in the choice of occupation and assistance in obtaining suitable employment should be forthcoming. Lastly, the speaker's own experience was that it was fallacious to suppose that adults did not respond well to conservative treatment, though operative aid might more often be called for in those cases.

Sir ANTHONY BOWLBY said that there was a period when the surgeon set out by operation to eradicate the tubercle bacillus; after a very considerable experience of surgery he thought he could say that this was a thing the surgeon was unable to do. Here and there a surgical lesion might be removed; but what was now appreciated was that whilst the surgeon could not kill the tubercle the patient could, only the patient required perseverance and encouragement. He had been convinced, as a result of *post-mortem* investigation, that it was of no use trying to eradicate tubercle by local operation, because, on examining patients after death, it was invariably found that they had tubercle in some other part of the body. The growth of tubercle in bone acted as a solvent on the bone salts, and as a consequence a very considerable amount of bone was gradually dissolved and the fibrous stroma of which the bone was composed was ultimately removed. The patient himself did what the surgeon had often tried to do, but whereas the patient actually did remove the tuberculous material, the surgeon by his intervention took away a good deal of bone which was quite capable of recovering. It was not sufficiently appreciated that a great amount of tuberculous bone could be removed without external operation at all. Nevertheless, the surgeon was not altogether out of court. He had to step in to remove the dead material. In a great many cases, when the process had ceased, there was left behind a good deal of material, either caseous or calcified material, or purulent fluid. The surgeon usually did not require to remove the former, but the latter he could remove by aspiration. Tuberculous disease of the knee was sometimes better treated by operation, whereas tuberculous disease of the hip was rarely well treated by operation, and when the two conditions were compared it was easy to realize that the surgeon might be able to remove the whole of the tuberculous tissues of a knee, whereas the so-called excision of a hip seldom removed the whole disease. At the present time it was not sufficiently appreciated how much was required for the treatment of this class of patient. People were content to say that the patient should be treated out of doors, and so on, but, as Sir Henry Gauvain had rightly

said, the question was not one of convalescence but of treatment. And it was of no use allowing a child with a tuberculous hip simply to lie outside in the sun without appliances or any other form of special treatment. A great deal of incomplete treatment was done in these cases. Sir Henry Gauvain had demonstrated at Alton how much more than merely passive treatment was necessary.

Mr. T. H. KELLOCK said that when surgeons used to operate in cases of tubercle, except in amputations possibly, all that they did was to remove the débris, the result of the disease, and they could not hope by any operation for tubercle to cure the child. Even locally the disease was too far spread for them to hope that by excising the hip-joint or the knee they were going to remove the whole of the tuberculosis. Mr. Kellock urged the value of iodine and its preparations, which killed tubercle if thoroughly brought into contact with the organism. The application might be constitutional through the agency of the blood, and local at the seat of the disease. If a patient were given sufficient potassium iodide the disease might be, if not cured, at least brought to a standstill. Given clean tubercle, without suppuration, potassium iodide should be pushed in very large doses over a long period. In local treatment the application of the iodine was even more important. In tuberculous abscess the iodine in liquid or gaseous form must be brought into close contact with the whole of the walls. An abscess should be aspirated, and the contents replaced by an equivalent, or almost equivalent, quantity of some germicide. Personally, he always used a strong solution of iodine and potassium iodide, and, by combining the local and the constitutional treatment, a very large proportion of clean tubercle could be satisfactorily dealt with.

Dr. GORDON PUGH described various methods of fixation in spinal disease of children, including a special appliance which he used at Carshalton. Mr. W. H. TRETHOWAN referred to the peculiar difficulties of the out-patient department, and the necessity for standardized treatment in hospital. He praised plaster fixation, which he thought far superior to the Thomas splint. Mr. GIRLING BALL also spoke of the difficulty of out-patient treatment, and agreed with Mr. Trethowan in his criticism of the Thomas splint for spinal disease. In his experience it was very seldom that tuberculous disease of the hip-joint completely recovered. The cases were nearly always left with a certain amount of stiffness and deformity. Mr. P. B. ROTH said that in closed tuberculosis treated without operation, under proper conditions, and in good surroundings, the prognosis was excellent. He quoted statistics from an institution in Switzerland indicating that 80 or 90 per cent. of cases were curable, and in an average time of fifteen months. In open tuberculosis the prognosis was very doubtful.

Sir HENRY GAUVAIN was precluded by the lateness of the hour from replying, but he commented on the fact that every speaker, without exception, now approved the non-operative treatment of tuberculosis.

EXOPHTHALMIC GOITRE.

THE discussion on exophthalmic goitre, which had occupied the Clinical Section of the Royal Society of Medicine, combined with the Sections of Medicine and Surgery, for two evenings (BRITISH MEDICAL JOURNAL, February 19th and March 5th), was brought to a close on March 11th.

Mr. C. A. JOLL, in reopening the discussion, said that in the true disease the danger of the operation and the degree of benefit likely to follow depended very largely on the length of time during which the disease had been present. He advocated the ligation of the superior thyroid vessels in very mild early cases, which he had occasionally seen cured by this procedure, and as a preliminary step in grave and advanced cases. The operation was simple and very suitable for local anaesthesia, and a striking improvement often followed. It was generally necessary to resect a part of the gland three to six months later, and this could be done at that stage with less risk than would be involved in immediate resection. Mr. Joll confessed himself unable to understand those who claimed that it was necessary in operating for exophthalmic goitre to remove every scrap of gland tissue in the neighbourhood of the recurrent nerve. If a small portion of the gland were left in this situation, cases of recurrent nerve paralysis did not occur, and he understood that the incidence of this disastrous complication was very high where this precaution had not been adopted. He had often examined this little piece of gland during secondary operations for the removal of a further portion of gland, and in no case had he seen any evidence of its hypertrophy. The solution to the problem of the treatment of the disease seemed to him to lie in earlier operation, more comprehensive resection, and avoidance of haemorrhage during operation.

Dr. LEONARD WILLIAMS stated his conviction that there was no more justification for operating on the thyroid gland than for operating on the kidneys in a case of diabetes. The worst symptoms of the disease—cardiac, and, following upon that, mental and nervous—were due not to the thyroid, but to the thymus, which had been too little considered. The thymus gland was enlarged in over 85 per cent. of the cases. He was not in the least anxious to take from the thyroid the part of the villain of the piece and give it to the thymus, but if a gland was to be attacked at all it should be the thymus.

Dr. C. M. WILSON said that since 1912 there had been practically no advance on the subject, and medical men were as far from agreement now as they were then; and that seemed to him a remarkable state of affairs, the more so because it had arisen, not around some difficult question of causation, but around the question of results. The terms used when speaking of the disease did not succeed in conveying to others the type of case intended or its severity, and that difficulty might be overcome by expressing in figures or curves on charts the character of any one case at any one time. One of the reasons for their backwardness in solving the problem was because they had not all got the same standard. There were too many advocates of different procedures, making too many comparative statements.

Dr. KINNIER WILSON was disappointed that so little had been heard in the discussion about the pathology of a disease treated in so many different ways. He agreed with Dr. Leonard Williams that exophthalmic goitre was not a disease of the thyroid. He would regard it as essentially a neuro-glandular disease. It was impossible to dissociate the nervous aspect of exophthalmic goitre from any of its other aspects.

Dr. MARTIN BERRY gave an account of some cases in which *x*-ray treatment was successfully applied. He believed that in no case of exophthalmic goitre was *x*-ray treatment contraindicated, except, possibly, a case in which nervous dyspnoea was present, due to actual pressure on the trachea.

Dr. HECTOR MACKENZIE, the original opener of the discussion, said that allusions had been made to his "conversion" to surgical treatment, but the fact was simply that in earlier years, although he had occasional good reports of operations, and had always been of opinion that surgical treatment in certain cases was probably the best treatment for the disease, he was disheartened by the total mortality; but since 1915, when he was first introduced to Mr. T. P. Dunhill's treatment with local anaesthesia, he had found the results of operation as good as they had formerly been bad under a different procedure. Of the cases on which Mr. Dunhill had operated for him, not one had been lost, and all had benefited. The chief point which came out of the whole discussion was the surgical advance which had been made, and the fact that the operation now, by expert surgeons, was comparatively safe. He disagreed with those surgeons who had advocated strongly the ligature of the arteries. This operation might be looked upon as comparatively safe, but he had never seen any really satisfactory result from ligature of the arteries alone. If operation was going to be undertaken, it was not worth while wasting time tying arteries when far better results could be got by thyroidectomy. Dr. Mackenzie went on to analyse some of the statistics which had been presented by the *x*-ray advocates, and mantained that they were not as convincing as might appear at first sight; many of the cases reported to be benefited by *x* rays were not marked cases of the disease. In conclusion, the outlook for patients with exophthalmic goitre was very much brighter now than at any previous time. Surgery practised on the lines of prudence would help to restore many to health, and would save an increasing number from drifting into a

state of chronic invalidism. Every effort should, however, be made to cure the disease by medical means, and if operation was undertaken medical treatment must be carried out after as well as before it.

Mr. T. P. DUNHILL, who also replied, said that in cases in which ligature of the arteries could be done easily it was not necessary, and in the cases in which it might be regarded as quite necessary it was dangerous. When it was necessary for this to be done it was almost as easy and safe to remove part of the lobe. The discussion had suggested to him that there should be only one person in charge of the case, and he the physician, and that so long as the physician was piloting the patient back to health there was no need to bring in the surgeon. But when the physician found that the case was not going as it should it became a matter for the exercise of a dual intelligence, and it must be left to the surgeon, of course, to decide as to the best time to operate, the nature of the anaesthesia, and the extent of the gland to be removed.

OCULAR PALSIES.

THE Sections of Neurology and Ophthalmology of the Royal Society of Medicine, Dr. JAMES TAYLOR presiding, combined in a discussion, on March 10th and 11th, on the subject of ocular palsies, accompanied by a demonstration of cases. The discussion suffered to some extent from the extreme complexity of the subject, and from the fact that most speakers went on lines of their own, each describing a different type of palsy.

The subject was introduced by Dr. GORDON HOLMES and Mr. LESLIE PATON. The former gave a careful exposition, fully illustrated, concerning mainly anatomical investigations into the nervous and muscular structure involved. Mr. Paton sketched the various categories into which oculomotor paralysis might be divided. His grouping was: (1) Paralysis of central and cerebral origin, comprising three subgroups: (*a*) supranuclear lesions, (*b*) infranuclear lesions, (*c*) nuclear and nerve-root lesions; (2) paralysis of extracerebral origin—that is, of nerve trunks—again comprising two groups: (*a*) intracranial and (*b*) intraorbital; (3) paralysis of muscular origin. Nuclear ophthalmoplegias or ophthalmoplegias proper could be subdivided into acute and chronic types. Good examples of the infective type of acute ophthalmoplegias were found in lethargic encephalitis, influenza, and syphilis, but in a very definite proportion of acute ophthalmoplegias no infective agent could be found. The most important form in chronic progressive ophthalmoplegia was that occurring in tabes and general paralysis of the insane. Besides these, there were certain ophthalmoplegias of congenital origin and others which were of a distinct familial type.

Mr. BISHOP HARMAN commented on the comparative rarity of these cases. In a consecutive series of 5,000 patients he found only 27 cases of ocular palsy, 17 of whom were males and 10 females. Paresis due to injury headed the list with 7 cases, syphilis came next with 5, and general vascular disease or degeneration with the same number. Two cases due to exposure were likely to be a bone of contention between the neurologist, who was not inclined to admit such a cause, and the ophthalmic surgeon, who credited it. In one of these there were undoubted manifestations of inflammation over the affected muscle, and both cases were cured with notable rapidity. He agreed that, apart from the cases of paralysis due to direct injury to the bones of the orbit and his two cases due to exposure, the occurrence of such a paralysis was a sign of serious general disease, but his cases afforded no evidence that life was thereby shortened.

Dr. KINNIER WILSON laid stress upon the difficulty of determining the exact etiological factor, but thought that unilateral cranial polyneuritis had to be regarded as a distinct clinical possibility. Mr. J. GRAY CLEGG described a case of ophthalmoplegia in Graves's disease, and Mr. FOSTER MOORE also dealt with the condition in Graves's disease, and said that it seemed probable that when deficient movement of the eyes occurred in this disease it was due to impairment of the function of the muscles, while marked exophthalmos would introduce a mechanical factor contributing to the same result. Dr. JAMES COLLIER described a case in which there was bilateral palsy of the sixth nerve following spinal anaesthesia. Mr. M. L. HINE spoke particularly of the group of chronic nuclear palsies and reviewed the literature. Dr. WILFRED HARRIS raised the question as to whether a rheumatic neuritis of the motor branches of the third or sixth nerve in the orbit could be fairly diagnosed. The PRESIDENT expressed his scepticism about paralysis of the ocular muscles of so-called rheumatic origin. He had been watching for a good many years cases of seventh-nerve paralysis and had never yet seen sixth-nerve paralysis associated with it.

Dr. GORDON HOLMES, in summing up the discussion, said that his experience of ocular palsies had been considerable, especially since he had been on the staff at Moorfields, and he was always conscious of the difficulty of deciding what any palsy might be due to. It was usually only by means of associated disease that a presumptive diagnosis could be made. In all groups of ocular palsies there was a considerable paucity of careful histological work. No doubt muscular weakness was due to muscular conditions in a certain number of cases, but his experience was that in a considerable proportion of patients with Graves's disease with ocular palsy there was relatively little proptosis.

PATHOLOGY OF INFLUENZA.

AT a meeting of the Pathological Section of the Liverpool Medical Institution, held on February 10th, with the President, Dr. J. E. GEMMELL, in the chair, the adjourned discussion on Dr. Adami's paper on "The pathology of influenza" (BRITISH MEDICAL JOURNAL, January 8th, 1921, p. 48) was opened by Dr. R. J. M. BUCHANAN. Dr. Buchanan said that in the epidemic of 1918, from the U.S.A. troops about 450 cases of the disease were admitted to three of our auxiliary hospitals to which he was consulting physician. The outbreak was serious, and it soon became evident that the cases could be divided clinically into four groups: (1) The mild catarrhal type, (2) the pneumonic type, (3) cases with physical signs of bronchiolitis, (4) cases of profound toxaemia, with little or no respiratory phenomena, in whom coma vigil was the rule, and who, with few exceptions, died. His clinical observations led him to the conclusion that in that epidemic they had to deal with a triple or multiple infection process. He briefly described the history of the previous epidemics, and showed that the same division into groups was seen even in the 1889–92 epidemics. He thought this similarity in classification in different epidemics supported the theory of multiple infection, and in support of this he quoted Washbourne, Lister, Gochez, Gillespie, Cole, and Sutton and Sevier.

Professor ERNEST GLYNN quoted some experiences of the influenza epidemic among the American soldiers in Liverpool: direct films from the sputa of 13 cases showed pneumococci and influenza group in 5, influenza group in 2; blood cultures from 70 cases showed pneumococci in 9, pneumococci and streptococci in 2, influenza group in 2; 22 post-influenza empyemas showed pneumococci in 9, streptococci in 8, pneumococci and streptococci in 1, pneumonia and *Staphylococcus aureus* in 2, streptococci group in 1, while 1 was sterile. He quoted several cases in which the bacilli of the influenza group were numerous in the trachea and bronchi, but pneumococci scanty, whereas in the pneumonic lung alveoli the reverse obtained. A mixed influenzal pneumococcal and streptococcic vaccine which he had made was extensively used for treatment of the American troops, but he had no reliable data as to its value. As "influenzal pneumonia" was often accompanied by septicaemia, vaccines seemed inadvisable on theoretical grounds.

Dr. E. CRONIN LOWE, by means of a series of lantern slides and sections, pointed out the well recognized importance of the post-nasal space and accessory sinuses as the focus of primary infection in influenza. He showed that while in the simple pyrexial cases the intensely influenzal mucosa of those areas gave rise to frequent epistaxis, etc., and was associated with a toxaemia, in other cases which developed later the severe fulminating type of influenza, the condition was due to a generalized bacteriaemia, originating in the infection of the congested pharyngeal veins and extravasated blood in the submucosa of this region. This was carried probably often in the form of minute infective emboli, travelling by the normal anatomical route, and would be arrested in the terminal

arterioles of the pulmonary artery, which were situated around the terminal bronchioles. In this way he considered, as Dr. Herbert French had suggested elsewhere, that the rapid and earliest lung infection took place, giving rise to a peribronchiolitis of haemic origin, which would account for the pathological appearances so constantly found present in these more rapidly fatal cases. The protective functions of the ciliated lining epithelium having been thus damaged allowed of a later infection by direct extension from the upper air passages along the bronchial tract. He pointed out that from this point of view the three important factors in treatment were regular local hygiene of the post-nasal space, prophylactic vaccination against the three organisms principally concerned—namely, *B. influenzae*, streptococci, and pneumococci—while in the actual treatment of the septicaemic type of case the prompt, early, and adequate administration of curative streptococcal or pneumococcal serums should biologically be the right treatment; generally 50 to 100 c.cm. of serum, given intravenously and twice daily, would be required.

Dr. A. GORDON GULLAN said that when on service with the British Expeditionary Force in the spring of 1916 he observed an outbreak of influenza of a mild type without any respiratory complications, which was chiefly classified as P.U.O., or trench fever. Early in 1917 he noted cases of influenza complicated with pneumonia and other respiratory affections, but in 1918, when officer in charge of the Military Hospital, Gibraltar, two severe outbreaks of influenza occurred; the first, in June, was in several cases accompanied by respiratory complications, but in no instance with a fatal termination; the second, in October, was much more virulent, and showed signs of marked toxaemia. In this latter epidemic the respiratory type was much more prevalent, especially in the form of lobar pneumonia, often accompanied by general bronchitis and most severe cyanosis. In 355 cases, 77 developed pulmonary complications, and of these 18 terminated fatally. It was noticeable that no soldier affected in June contracted the disease in October. In the sputa which were examined the bacillus of influenza and the pneumococcus were found.

AT a meeting of the Sheffield Medico-Chirurgical Society, held on March 3rd, with the President, Dr. F. J. SADLER, in the chair, Sir D'ARCY POWER read a paper on the palliative treatment of aneurysms by wiring. He showed Colt's apparatus for the rapid and aseptic introduction of wire into aneurysms, and pointed out various points of practical importance in its use. He then gave details of the more recent cases of thoracic and abdominal aneurysm in which he had employed this method of treatment and the subsequent history of the patients whose cases had been recorded in the *Proceedings* of the Royal Society of Medicine in 1912. One of the cases was illustrated by a very complete series of *x*-ray photographs showing the wires in position and the changes undergone by the aneurysm during a period of two years. He arrived at the general conclusion that in the majority of cases there was evidence of cure, as the patients were alive and at work ten and more years after the wire had been introduced. He also appended an interesting table of cases compiled by Mr. G. H. Colt, showing the duration of life from the first recorded symptoms to the time of death in 133 men and 8 women suffering from thoracic or abdominal aneurysms. The PRESIDENT, Professor A. J. HALL, Professor A. M. CONNELL, Dr. A. E. BARNES, and others took part in the discussion which followed.

THE London County Council has decided to grant to the four whole-time London coroners who receive a gross salary of £1,500 a temporary addition of £300 a year, to continue until such time as the Council obtains parliamentary powers to pay coroners fixed salaries or until March 31st, 1922, whichever be the earlier date. The payment is to be conditional on each coroner submitting quarterly a certified statement as to his out-of-pocket disbursements. Out of his gross salary a coroner has to pay for the services of a deputy and of a clerical assistant, as well as for office accommodation and travelling. In the pre-war period such expenditure was computed at 25 per cent. of the total income. From figures which the coroners have recently furnished, their present out-of-pocket expenses average £400 a year.

Reviews.

"PHENOMENA OF MATERIALIZATION."

William Crookes, Oliver Lodge, Camille Flammarion, Charles Richet, Lombroso, Morselli, Flournoy, Zöllner, Ostwald: such is the constellation of stars which shine in the firmament of spiritistic or mediumistic phenomena. Respect for the eminence of these men induces us to deal at some length with the volume entitled *Phenomena of Materialization*,[1] a translation into English of a book written by Baron von SCHRENCK NOTZING, "practising physician" in Munich; it is a weighty tome of 340 pages, which by its endless repetitions produces a feeling akin to the hypnotic trance. Moreover, we regard it as a duty to examine and criticize the beliefs, observations, and theorizings of the human mind, so far as time and space allow; especially when a belief has reached such a stage that thousands of mankind are deriving consolation from their faith in it. When its professors allege a scientific basis for their faith, and physiology and psychology are dragged in to support it, the duty of the medical profession to inquire into the origin and methods of the cult becomes even more insistent.

The expression "materialization phenomena" is applied to the alleged production of forms and materials of organic or even inorganic matter by a so-called medium, who, it is assumed, has been deprived of the possibility of having concealed the materials about her person or in her surroundings. The manifestations are supposed to emanate from the medium—from her skin, her eyes, her mouth, or other orifices of her body. The emanations may take the form of threads, white, grey, or black, of clouds or mists, of ill-defined solid masses, of materials resembling muslin, wool, paper, or other mundane substances; hands, arms, or heads may be produced, and occasionally fully formed phantoms of distinct character and definite features and forms. In mediumistic jargon such manifestations are described as "teleplastic phenomena," as distinguished from the "telekinetic" class, which comprises the spiritists' table-turnings, levitations, raps, and "direct" writing.

In his preface Baron von Schrenck Notzing confesses that hitherto the observations of mediumistic phenomena have not fulfilled the requirements of exact scientific method, but the translator asserts that in the present work the reader has "a full scientific account of a set of strange occurrences observed under the strictest conditions of control, and as yet quite unexplained." As we have not witnessed any of the séances we do not presume to express an opinion on the reality or otherwise of the phenomena described. But the author and his translator lay claim to the adoption of an exact scientific method, and it is with this claim that we propose to deal. Let us take first the attitude of Baron von Schrenck Notzing towards his mediums and their friends.

The medium chiefly employed was called Eva C., who seems to have been 23 years of age when the sittings began in Paris in 1909, at the house of her "protectress," Mme. Bisson. The medium had had four or five years' previous experience in spiritualistic circles. At all the sittings recorded in the book Mme. Bisson appears to have been present; at several sittings Mme. Bisson was alone with the medium, and some of the most remarkable phenomena seem to have occurred for the first time at these *tête-à-têtes*. Our first criticism of the author as a scientific person is in this matter of Mme. Bisson. He is very angry with people who have hinted that possibly Mme. Bisson acted in collusion with the medium. "If some savants assert that Mme. Bisson's mere presence at the sittings constitutes a source of error, this shows a deplorable lack of understanding of the complicated mechanism of the mediumistic occurrences." He speaks of the "unjustifiable and insulting insinuation against this lady," and thinks that he has disposed of the criticism by stating that Mme. Bisson, "in the spirit of a purely scientific research, repeatedly allowed herself to be examined" by him. Yet on many occasions, and "during the frequent incidents of

[1] *Phenomena of Materialization.* A Contribution to the Investigation of Mediumistic Teleplastics. By Baron von Schrenck Notzing, Practising Physician in Munich. Translated by E. E. Fournier d'Albe, D.Sc (Lond. and Birm.). London: Kegan Paul, Trench, Trubner, and Co., Ltd.; New York: E. P. Dutton and Co. 1920. (Double cr. 8vo, pp. xii + 340; 225 figures. 35s. net.)

the sittings which would leave any other experimenter helpless, Mme. Bisson always finds the right means to restore the disturbed psychical and physical equilibrium of the medium." The right means apparently do not exclude entrance into the cabinet occupied by the medium. He goes on to say: "Besides, with what motive could Mme. Bisson, living in Paris, try to deceive a foreign savant for four years?" Because Mme. Bisson housed and fed the medium for three and a half years, "there cannot be the slightest doubt that Mme. Bisson has conducted the four years' investigation out of a pure interest in the subject, in the scientific exploration of the mediumistic problem." The fact that the lady has published her own observations "vouches for the authoress's bona fides"; and, again, "The imputation of fraudulent assistance is thus deprived of any reasonable basis."

With regard to mediums, the Baron admits the possibility of fraud in certain manifestations. Thus he says that "the person under test may, if the effort does not succeed at once, or if the forces available do not suffice, easily be led to assist, to some extent unconsciously, with the muscles." In both Eusapia Paladino and in Eva C. the violent muscular action suggested the pains of childbirth, and are described as "mediumistic labour." "In combination with a vivid desire for success they easily lead to an unconscious mechanical execution of the task by the limbs." A medium named Mrs. d'Esperance was, the author says, regarded as an honest and credible person, and while she was believed to be sleeping in a cabinet her shadow friend "Yolande" was seized. On this Mrs. d'Esperance says: "The man who had seized her said it was I. This assertion appeared to me so extraordinary and incomprehensible that I could have laughed, if my utter helplessness and weakness had not rendered me incapable of thinking or even of moving." On this the Baron remarks: "In consequence of this shock this lady of unimpeachable character broke down completely and became seriously ill." This sympathetic attempt to defend the lady may be chivalrous, but is it scientific? In describing how the spirit "Mary," produced by Florence Cook, Sir William Crookes's medium, was seized and found to be the medium herself in a flannel dress and corsets, the Baron does not even consider the possibility of fraud. He suggests "transfiguration," "transmutation," or pseudo-materialization as the explanation. We believe we are correct in saying that the earlier manifestations by Eusapia Paladino were so palpably unreliable that the Society for Psychical Research refused to investigate them further. When, fifteen years later, the medium was examined again, a committee of the same society reported that, although some of the results were still as before, there were others that could not be explained. Would it, we may ask, be scientific to assert that, because some of the tricks of a conjurer are beyond our comprehension, these tricks cannot be due to deception of our senses? Surely the scientific inference is that all the effects may be produced in a like manner, but that the means at our disposal do not allow us in all cases to perceive the deception. The Baron, however, will have none of this explanation. Everything that he cannot see through must be produced by some power of which we know nothing. If it is pointed out to him that the curtains of the cabinet in which the medium has been concealed are studded with pinholes, it does not make him sceptical in the true sense of the word. He does not institute a scientific inquiry into the way in which the pinholes occurred; he sets about giving some ingenious explanation which is merely a figment of his imagination. The great difficulty experienced by our learned men with mediumistic leanings is that the mediums take care that the ordinary methods of scientific investigation shall not be applied to their performances. Thus the Baron is continually afraid that an attempt to remove a portion of the materialization in the case of Eva C. would lead to a serious effect on her health, or might even cause her death. So far as we can ascertain from the text, the only ground for his belief is that on one occasion an unsuccessful attempt to capture a portion of brown substance from the shoulder of the lady led to an outburst which would seem to have been of an hysterical character. We think he might have been reassured by the fact that the capture of Mrs. d'Esperance in the guise of "Yolande" did not lead to death, but merely to the discontinuance for a long time of the sittings—not, perhaps, an undesirable result. As a matter of fact some men of science seem to throw away the whole of their scientific equipment and training when they become interested in spiritistic phenomena. The Baron urges the necessity for the combination of an extreme degree of scientific scepticism with personal benevolence to the medium. It seems to us that a benevolence which for four years tolerated what appear to be deceptions growing in audacity with practice up to the production of portraits which look to us like drawings on paper, must in the end have considerably diluted the spirit of scepticism. "If," says the Baron, "we consider it *a priori* impossible to protect ourselves against prestidigitation and other fraud practised by the mediums, we thereby declare the human senses to be incapable of scientific determinations of any kind." To which we reply that if *a priori* you assume the existence of "teleplasma," and then accept conditions of investigation which practically preclude you from checking the impression of one sense by the impressions of other senses, you have in effect rendered yourself incapable of any scientific determination at all. To sprinkle a book with apologies for the "martyrdom of the medium" because even some measure of control has been attempted surely prejudices the position, and must render nugatory any claim to the scientific spirit.

The Baron's attitude to the manifested material is curiously unscientific. Thus, in one place Eva's head is covered with a white cloth. "A critic," says the Baron, "would at once have the impression that Eva had put a handkerchief over her head, but . . . " and an irrelevant detail is dragged in with complete disregard to scientific investigation. The description of this sitting ends with the statement that "the medium was obviously anxious to mask herself with her teleplastic productions." Is it scientific to describe what might have been a handkerchief as a "teleplastic production"—at all events, until it has been proved not to be a handkerchief? We learn, however, that the interest of the highest possible advancement of the phenomenon is greater than the constant diversion of the medium's attention towards the control, *as such control hinders the rational development of the phenomena* and reduces the efficiency! This view of the pernicious effect of control doubtless accounts for the fact that the Baron made no strenuous efforts to clear up doubts which arose in his mind when he noticed on one occasion that a flat lifeless structure resembling a lady's glove had replaced the hand of the medium which was supposed to be on her knee. When the medium had reached the stage of producing pictures of faces, the Baron argues that they could not have been ordinary photographs. He fails, however, to bring into juxtaposition with this inference the fact that Mme. Bisson had a studio and was something of a sculptor. With regard to one of the pictures which showed numerous rectangular creases, as of paper unfolded, the author remarks that "anyone who does not realize the rigorous precautions taken must necessarily assume that a packet was fraudulently introduced." But the Baron airily remarks: "So long as no such trick is actually performed under the same conditions . . . the discussion of the hypothesis 'of conjuring' seems superfluous." On another occasion the discovery on the floor of some small white particles, giving the impression of small balls of paper crushed with a shoe, is discussed as not seeming to have any connexion with the "phenomena." During most of the séances the medium is stated to have been in a hypnotic trance. This may be so; but it seems curious that while still in such a state of trance the medium should be able to come forward at the end of a séance, take off her tights, and ask for a "gynaecological" examination! However, this is a matter which we must leave to those experienced in hypnotism.

It seems to us that Baron von Schrenck Notzing effectually puts himself out of court as a scientific observer. Had he been content to refrain from all allusion to the martyrdom of mediums; had he not made clear from the outset his belief in teleplasma; had he merely recorded strictly the impression on his sense of vision of the manifestations even to the dreary length of this book; had he not tried to invent explanations for such things as the pinholes in the curtain and the paper-like apparitions; had he tried to

devise methods for discovering the origin of the pinholes and the paper creases—had all these things happened, it might have been possible to treat his book with some respect. As it is, the production is a reproach to any man calling himself a scientist, for it neglects every condition of true scientific investigation. Instead of inquiry we have assumption; instead of impartial statement of observation we have a prejudiced attempt to fit the phenomena into a belief. When one of the investigators present at some séances ventured to state that everything was trickery, the Baron tersely remarks, "On account of this negative attitude Dr. Specht was not invited to further sittings."

Our object in dealing at such length with this book is to protest against the assumption of scientific method when no real trace of such method exists. Baron von Schrenck Notzing compares the present position of mediumistic investigation with the position in the distant past of astrology in relation to astronomy and of alchemy in relation to chemistry. But he cannot have it both ways. Scientific method has advanced considerably since the days of astrology and of alchemy. If the Baron's science has not advanced beyond the stage of astrology and alchemy, he should not lay claim to scientific method, which is something far different from the method of the astrologer and the alchemist. We recall again the names of the eminent men of science with which we began. It is excusable that an imaginative novelist should permit himself to swallow any tale of the marvellous that may be presented to him. But that men of eminence in the scientific world should delude themselves into supposing that their observations of mediums resemble in the remotest degree the methods of science is deplorable. Whether mediumistic powers exist or not, the investigation of those pinholes in the black curtain should certainly precede the elaboration of "teleplastic hypotheses."

SURGERY.

HEY GROVES'S *Synopsis of Surgery*[2] is so well known that it needs no introduction when, as a new edition, it makes its bow for the fifth time. This alone is sufficient proof that there is a need for a book of the kind, and if one must have a "cram" book, then this is just about as good as it is possible to have. We believe its popularity to be deserved. The previous edition was reprinted three times during the war, and the author has taken advantage of a new edition to incorporate in the text some of the more important lessons the war taught. Knowing Mr. Hey Groves's predilections as we do, it does not surprise us that the chief additions have been made to the section on fractures. The section dealing with blood transfusion is good, the choice of donors and technique being well covered in a very condensed but lucid form. In a book of this type any surgeon particularly interested in a special subject will easily be able to find fault. It is not intended to be a book for specialists, but on the whole we believe that the information which it gives the student is sound. A few line drawings are added to the new edition, and the surface anatomy figures have been partly coloured.

Mr. IVOR BACK and Mr. TUDOR EDWARDS contribute the book on *Surgery*[3] to the "Students' Synopsis Series" of Messrs. J. and A. Churchill. The work is intended to help the student to revise his work and not to supplant his textbook. It is addressed to the less industrious student, and it is possible that he may find it useful.

Dr. ARCHIBALD MCDONALD, of the Johns Hopkins University, is to be congratulated on his *Essentials of Surgery*[4]—a volume intended for probationers and nurses, and in most respects a thoroughly good book. The whole ground is well covered, and the descriptions of the various diseases which come within the purview of the surgeon are clear and concise. The nurse whose privilege it is to listen to a course of lectures based on this manual will be fortunate. At the end of each chapter is a list of suggestions for illustrating the chief points under discussion. They evidently do these things thoroughly in the United States, for we note that after the lecture on the abdominal cavity we are advised to demonstrate the mesentery, omentum, and serous layers "on anatomical chart or laboratory animal." The method of teaching of nurses by means of selected cases and case-histories is admirable and should be employed widely. The only drawback to the book is its extremely "dry" appearance, due entirely to the arrangement of the type on the page and the kind of paper used. There is a valuable glossary at the end.

[2] *A Synopsis of Surgery.* By E. W. Hey Groves, M.S., M.D., B.Sc.Lond., L.R.C.S.Eng. Fifth edition. Bristol: John Wright and Sons, Ltd. 1920. (Cr. 8vo, pp. 628; 13 plates, 21 figures. 17s. 6d. net.)

[3] *Surgery.* By Ivor Back, M.A., M.B., B.C.Camb., F.R.C.S.Eng., and Tudor Edwards, M.A., M.C.Camb., F.R.C.S.Eng. Students' Synopsis Series. London: J. and A. Churchill. 1921. (Cr. 8vo, pp. 488. 15s. net.)

[4] *Essentials of Surgery.* By Archibald McDonald, M.D. Philadelphia and London: J. B. Lippincott. (Pp. 265; 46 figures.)

SYPHILOLOGY.

IN the second edition of Dr. LLOYD THOMPSON'S *Syphilis*,[5] the subject has been brought thoroughly up to date. It has, moreover, been treated in a comprehensive manner, for, as the author states in his preface:

> "Syphilis is no longer to be considered a genito-urinary disease, nor a dermatological disease, nor a disease belonging exclusively to any specialty, but is to be thought of as a disease requiring knowledge in all fields of medicine."

The question of visceral syphilis, which did not receive much notice in the previous edition, has been amplified, and an excellent bibliography of the literature of the subject is appended for the use of those requiring further information. In order to render the work as practicable as possible, special attention has been given to diagnosis and treatment. The chapter on laboratory diagnosis has been enlarged, for laboratory aid is more important for successful treatment in syphilis than in any other disease. We regret that the description of the technique employed in the examination of venereal sores for the presence of the *Treponema pallidum* has not been rendered still clearer by the addition of diagrams and micro-photographs. Although illustrations are given of the organism of syphilis demonstrated in the tissues by means of various staining methods, there are no plates to assist the reader in distinguishing the *Treponema pallidum* from similar organisms under dark-ground illumination. Chapter VII contains a full description of complement-fixation tests and other aids to diagnosis. Since writing his previous edition the author has apparently lost faith in the luetin reaction.

Chapter IX deals with the disease from the public health point of view. In the author's opinion education should not stop at the teaching of the dangers of venereal disease, but should include dissemination of knowledge of methods of personal prophylaxis.

> "Free prophylactic stations for both men and women should be established and thoroughly advertised in all cities, where not only prophylactic remedies may be administered, but instruction in the methods of prophylaxis and prescriptions for the necessary materials be furnished."

With the objections of the moralists against such an arrangement he has little patience, believing that the fact that the disease is as likely to affect the innocent as the guilty is sufficient justification for adopting any methods of prevention likely to meet with success. Useful sections are included on the important subjects of standards of cure, and of syphilis and marriage. In the paragraphs dealing with the latter the dictum is laid down that no permission to marry should be given unless the Wassermann reaction is negative. The complete absence of clinical symptoms over an extended period is, in the author's opinion, insufficient justification for marriage with a positive Wassermann reaction.

Dr. Thompson is an advocate of intrathecal medication in all cases of neuro-syphilis. The technique he employs is a modified Ogilvie method, the injections being given at intervals of seven to ten days.

> "The intraspinal treatments should be continued until the spinal fluid becomes negative, or, in the case of paretics, for eight or ten injections if no objective or subjective improvement is noted. . . . If intraspinal treatments do not relieve cerebral symptoms, intracranial, either subdural or intraventricular injections, should be given a trial. No case of syphilis, from the chancre to paresis, should be given up until all means of treatment are exhausted."

[5] *Syphilis.* By Lloyd Thompson, Ph.B., M.D. Second edition, thoroughly revised. 1920. Philadelphia and New York: Lea and Febiger. (Med. 8vo, pp. 205; 81 figs., 7 plates.)

The book concludes with chapters on congenital syphilis. Altogether it is a remarkably complete work, and one in which practical matters, rather than points of academic or historical interest, have been emphasized.

NOTES ON BOOKS.

WILLIAM SUTHERLAND, whose interesting biography has been attractively sketched by the Professor of Physiology in the University of Melbourne, Dr. W. A. OSBORNE,[6] was an independent worker in the realm of advanced physics and never held any professorial chair. The great majority of his sixty-nine contributions to scientific literature, given in an appendix, are on physical problems, and many of these appeared in the *Philosophical Magazine*; but there are some on physiological subjects, such as the rate of the propagation of the nerve impulse, the chemistry of globulin, and the heat coagulation of protein. In addition, he did much to popularize recent science by writing in the lay press, and thereby advocated wise reforms in many directions, such as education, the position of women, abatement of the dust and smoke nuisances, and the beautification of Melbourne and the Yarra. Unfortunately he did not live to see the electrification of Melbourne's big suburban traffic, of which scheme he has more claim than any politician to be called the father, nor the utilization for power of the huge deposits of Victorian brown coal which his mental vision clearly foresaw. Possessed of an encyclopaedic knowledge, he was characteristically modest and honest; thus he refused all honours, and when approached for his assent to be nominated for the Royal Society, he sent the rather disconcerting reply that the proceedings and transactions of the Society were available in Melbourne, and that he was unaware of any other advantage attaching to the Fellowship. In face he somewhat resembled Tyndall, and was usually much sunburnt from exposure in the bush, in which he delighted. He chose a small income and an independent position, and after his sudden death his biographer comes to this conclusion: "Among the saints of science high place will assuredly be found for William Sutherland."

Dr. R. S. CARROLL'S *The Soul in Suffering*[7] contains five-and-twenty chapters written, as the author tells us in the preface, "with a constructively sympathetic understanding of the soul-need which comes to the suffering." Here the reader will find lay sermons, the commonplaces of consolation, set out with a magniloquence of philosophical and orotund verbiage, reinforced with quotation, analogy, and inextinguishable optimism. The book will doubtless find many readers, and should prove more helpful to sufferers than even the blessed word Mesopotamia.

[6] *William Sutherland: A Biography.* By W. A. Osborne. Melbourne: Lothian Book Publishing Co. 1920. (Cr. 8vo, pp. 101; 4 illustrations. 7s. 6d.)

[7] *The Soul in Suffering.* A Practical Application of Spiritual Truths. By Robert S. Carroll, M.D., Medical Director, Highland Hospital, Asheville, North Carolina. New York: The Macmillan Company. (Post 8vo, pp. 241. 8s. 6d. net.)

ASSOCIATION OF CERTIFYING FACTORY SURGEONS.

THE Council of the Association of Certifying Factory Surgeons has recently drawn the attention of the Chief Inspector of Factories to two matters which are considered to be of considerable importance to certifying surgeons.

The first is the circumstance that, in connexion with the two last annual reports, they have not been asked to include any particulars respecting the allowing of conditional employment (Section 64 (5) F. and W. Act, 1901), but have simply been required to give details respecting "rejections." Section 122 (6) F. and W. Act, 1901, requires a record of all young persons ascertained by medical examination to be physically defective, and of the action taken by the certifying surgeon with respect to such. The word "results" is used, and as this signifies more than rejections, it is held that a return confined to these cannot cover the obligation. The system of conditional certificates, in spite of its imperfections, is regarded as having greatly extended the usefulness of the certifying surgeon, and as being of proved benefit to large numbers of young people on commencing their industrial career. Apart, therefore, from the strict legal requirement, it is considered of public interest that a full record of the "results" of factory medical examinations should be available. It has been pointed out that the action taken by the certifying surgeon, as a result of the defects found, depends, as a rule, more on the nature of the industry and its capacity for providing suitable alternative employment than on the nature of the bodily disease or infirmity *per se*, so that any particular defective may be totally rejected at one factory and certified conditionally at another; that the bulk of defectives may be regarded as of one class, dealt with in two different ways according to varying circumstances; that the incomplete return at present asked for cannot possibly give any idea of the discrimination exercised in dealing with these young people, and is therefore unfair to the surgeon as well as misleading to the public. Whilst the former publication in the Chief Inspector's annual reports of a complete summary of conditions attached to certificates of fitness is regarded as having undoubtedly served a useful educative purpose, in view of the labour entailed in compiling the table, the association does not press for its renewal. On the other hand, the Council suggests that a full classification of all those found affected with disease or bodily infirmity should be published under two divisions—namely, (1) rejections and (2) certified conditionally.

The second point is what the Association of Certifying Factory Surgeons considers to be the incomplete and unsatisfactory methods adopted in the effort to secure adequate first-aid treatment of the injured in those factories and workshops where provision for such is obligatory. The Council is convinced that no arrangements can be considered efficient unless placed under some system of regular medical supervision. It is the opinion that a satisfactory control of first-aid and ambulance arrangements could be readily obtained by making it an obligation upon the employer to obtain from the certifying surgeon—every three months in the case of works employing 500 hands or over, and every six months where under 500 are employed—a certificate to the effect that the provision made is suitable and sufficient. The Chief Inspector has been asked to consider the advisability of authorizing a medical representative of the department to discuss this matter with expert representatives of the association with a view to some practical scheme being evolved.

NOTE-TAKING IN GENERAL PRACTICE.

[FROM A CORRESPONDENT.]

IN reply to one who had expressed some dissatisfaction with the opportunities offered by general practice for the study of disease, and envy of the opportunities of the specialist, Sir William Gowers wrote:

"Cases which come under the notice of the physician and are instructive in detail are very few compared with the immense number which are seen only by practitioners, and the opportunities these present are wholly lost for want of a little careful note-taking and the knowledge of what to observe. Moreover, practitioners have the opportunity of doing what no one else can—following up cases and observing their course. This is of extreme importance after careful record."

This opinion is worth as much to-day as it was when given twenty-five years ago, for no one will dispute that careful note-taking is essential for both the science and the practice of medicine; it is valuable not only to help the attendant's memory, but to save his time. How much quicker to learn, how much more accurate, a patient's medical history that was recorded at the moment by the medical man in attendance at previous illnesses, than what can be dragged out or sifted from what pours out of a patient's memory of his past miseries.

And what is the time occupied in taking these notes? No more than that required to make the necessary careful inquiries; and the busier one is the more need is there to take notes, because with the rush of patients it is more difficult to remember the details of each case and because when one has previous notes to refer to less time need be taken in catechizing the patient. If there is not time to take notes, there is not time to see patients properly, and something is at fault either with the method or the means.

The Value of Records.

Any medical man who has kept the simplest notes of his cases must realize their value to himself, and conversely, how often must many have longed for such a record however brief!

It is suggested that notes such as the busy general practitioner can take will themselves be valueless, because it is not possible to name accurately most illnesses, that they will merely be notes of signs or symptoms and not interpretations of them, but surely this will be their true value. Clinical notes that are statements of fact must have greater scientific value than mere opinions; they will be of value not for adding up in rows, but for reference, research, and discussion. Even the interpretations of these signs and symptoms, under the heading diagnosis, will be of value if we realize that the term used represents not a disease but a condition.

It should be realized that the value of a clinical history often lies in the collection of many small details rather than in the record of any one big event; one small detail may be sufficient to make the evidence complete. Without the correction supplied by such records of fact, ill-founded opinions are apt to grow in a man's mind and to prejudice his views. The making of a note, however simple, if one has in mind at the time that the object of that note is future reference and help for one's self or someone else, must tend to make one think more and take more care; true it is often by no means an easy matter to find words in which to express symptoms and opinions, but the habit of doing it frequently and having to do it carefully should in time develop a better practice.

The special value of a general practitioner's record lies in the fact that he alone can see the whole of a disease from the very beginning, knows the conditions that existed before the beginning, and knows the life-history of the patient; he sees those beginnings of disease that, contrary to expectation, do not develop beyond a certain stage; he sees those diseases that are not fatal, though according to precedent they should be, and those conditions that develop into serious and fatal diseases when they are not expected to.

Note-taking and Research.

There are two types of clinical research, and the note-taking required for each is different. There is that advanced and detailed research such as is carried on at the St. Andrews Institute for Clinical Research under the direction of Sir James Mackenzie, which requires specially apt and trained observers. The other is that which may be conducted by the general practitioner.

In a report of the Medical Research Council (BRITISH MEDICAL JOURNAL, January 15th, 1921, p. 91) occur these words:

> "There are many problems in medical science which can best be studied, and some indeed which can only be fully studied, the Council believes, by men engaged in professional practice, who are in a position to follow the signs and results of disease and the effects of given treatment in suitable cases from their earliest to their latest phases. Studies, however, of this kind can only be successful if the professional man has some leisure and if he has access at need to laboratory and other resources, like those of a well-equipped hospital."

If these words do not apply to the family doctor, I do not know to whom they can. True the last sentence is not appropriate to the average general practitioner of to-day, but the Ministry of Health, or at any rate its Medical Consultative Council, has by its interim report shown the way and the desire to provide this opportunity for the general practitioner.

However, though much investigation can only take place in the conditions pertaining to an institution, it is important that disease should be studied in what one may call its natural surroundings, otherwise we cannot estimate properly the influence of these surroundings, and unless we know how this influence affects cause and progress, we cannot hope to find the means for prevention and cure.

This general practitioner type of investigation is of great, though varying, value; a medical man must, from his training, be competent to take notes, but practice and experience, interest and appreciation, will increase the value of his work. Whatever he may have been taught in hospital by his clinical lecturers, he yet must learn for himself the methods best suited to his practice, and he may learn much by comparing, when opportunity offers, the methods adopted by others.

The last thing wanted is a stereotyped method; that system and method will be the best which has gradually developed by a process of evolution and selection. Though in note-taking all depends on the "how," it will always be of prime importance to select the essential and the potentially useful. Facts must always be of more value than opinions, though the latter will often be worth much; the difficulty is to differentiate the opinion that is the result of long and careful observation and deduction from that which is founded on prejudice, inaccurate observation, and insufficient knowledge.

A mere statement of an incapacitating cause such as will do for a certificate of inability to work is not likely by itself to be of much value as a clinical note; the ideal clinical note will, if possible, contain something to indicate the pathological condition, the part affected, and the cause. For instance, "indigestion" by itself will not be very valuable, but "epigastric pain two hours after food," may be useful. Compare "rheumatism" with "arthritis, left knee, traumatic," or "arthritis, right wrist, wasting muscles hand and forearm, carious teeth."

The note-taking habit will surely be an incentive to all sorts of investigations, and it is very likely to stimulate particular interest in one or more special subjects, leading the way to that ideal specialism which is the outcome of special aptitude, interest, and opportunity, in a practitioner experienced in all branches of his work. Those specially interested in any particular part or parts of their work might with advantage keep a small subject index.

Fields for Investigation.

Records as to the results of some treatment would often do much to prove its use or uselessness and to prevent those generalizations which are so frequent and harmful, and exaggerated deductions from a few failures or a few successes. How useful, for instance, would be a record of every case of thyroid disease—the early history, heredity, water supply, progress and result of various treatments; every general practitioner in some neighbourhoods would in a few years have a wonderfully interesting collection, and if he and his neighbours would one day collate and compare these notes and deductions, they could hardly fail to draw up a valuable report. Or supposing that the carefully recorded life-histories of a large number of cases of cerebral haemorrhage were examined, how interesting and possibly surprising might be the findings as regards their relation to heredity, diet, dental defects, blood pressure, kidney disease, surroundings, and occupation. What opportunities there would be for learning more of the early history of phthisis, or the after-history of the so-called pre-tuberculous patient. Again, statistics of a sort might well be considered, such as the duration of incapacity from certain diseases and accidents, and the effect of surroundings on that duration of incapacity.

A medical man who notes the signs, symptoms, and treatment of his cases and their sequels at intervals during the patient's life, will accumulate a mass of facts for consideration and discussion with other men who have done the same, and with men who have made special study of particular diseases. It would not only add interest to work, but greatly increase its value, if this were done more or less systematically.

The members of a medical society or of a Division of the British Medical Association, might arrange a series of subjects of general interest which they would discuss at given dates—say in two, three, or four years' time, or even at longer intervals—one or two subjects being chosen for each year. Or such a scheme might be widened in its area and applied not to one or two medical societies only, but to the whole of England; and at suitable intervals, after consideration at various local meetings, these subjects might be discussed centrally at the Royal Society of Medicine, or the annual meeting of the British Medical Association.

There are all sorts of questions having local interest that might be considered, not only the life-history, causes and treatment of different diseases, but the incidence of disease as affected by occupation, general conditions, heredity, etc. Such consideration, based, of course, on the records made by those taking part, would take place first by individuals and then by groups. This would add much interest to the medical man's life, raising what may be mere drudgery to a delightful occupation; no doubt we might have to wash much gravel to find a few diamonds, but the reward is worth the work.

Sir John Lubbock wrote: "The most important secrets of Nature are often hidden away in unsuspected places; many valuable substances have been discovered in the refuse of manufactories." Twenty thousand medical men in daily practice: what an enormous amount of clinical evidence and experience they must have! We need give all our thought, not to preventing its preservation, but to devising means to make the best use of it.

AT the Third International Labour Congress, to be held at Geneva in April, the following medical subjects will be discussed: Protection against accidents, sickness, and old age; disinfection of wool contaminated by anthrax bacilli; prohibition of the use of white lead in the painting industry; prohibition of the employment of persons under 18 as firemen or stokers, and obligatory medical examination of children working on board shi-

British Medical Journal.

SATURDAY, MARCH 19TH, 1921.

THE NEW EPIDEMIOLOGY.

WE recently summarized the report of the Ministry of Health upon the pandemic of influenza, and it may interest some of our readers if we attempt to characterize certain ways of thinking which parts of the report illustrate.

A few years ago Dr. Hamer, more in anger perhaps than in sorrow, identified epidemiology with the Sleeping Beauty and bacteriologists with the authors of the spell. This, no doubt, was to go a little too far; the Sleeping Beauty has never been actually comatose; Dr. Charles Creighton was applying stimulants even before Dr. Hamer took the case into his very efficient hands. Yet it is at least certain that, down to a very recent date, the bacteriologist's views upon the etiology and prophylaxis of epidemic diseases were regarded in all the "best circles" as of much greater importance than the views of any other medical or non-medical investigators. Even now a considerable majority of medical men and nearly all laymen are realists. They demand to be shown something on a plate—a Petri plate—and to be told "this is the germ which causes the disease." The next step is either to exterminate the germ or devise an antidote. This step having been taken, the epidemic disease—by definition due to the germ—is, or ought to be, of only historical interest.

But orthodoxy has now to reckon with heretics. As generally happens, the heretics won their first successes through the mistakes of the orthodox and in virtue of their own audacity. On the one hand bacteriological realists drew too many bills on futurity which were not honoured on presentation, and again they did not always *seem* (as Dr. Hamer was never weary of pointing out) to agree perfectly one with another. On the other hand, they ruffled the feelings of a small but pugnacious group of statisticians, who, having acquired a technique at least as mysterious, and therefore awe-inspiring, as that of the immunologist, declined to be snubbed. The consequence is that a "new" epidemiology if still schismatic has at least some chance of acquiring orthodoxy. At first blush this new faith is not attractive; it is so easy to parody. The outraged realist proclaims that one of the "new" epidemiologists believes influenza to be not only influenza but everything else, and holds that a sufficient answer to criticism is to invoke the name of Sydenham with rapture; that another sees life as a monomolecular reaction and disease as terms of a Fourier expansion; while a third, emulating Hudibras and able to

> "Resolve by sines and tangents straight,
> If bread or butter wanted weight;
> And wisely tell what hour o' th' day
> The clock does strike, by Algebra,"

is still not quite sure that anything has been added to knowledge (except by statisticians) since Galen.

But it would not need the author of *The Elephant in the Moon* to handle the orthodox school at least as severely. While, as we have surmised, the opportunity of the "new" epidemiologists was afforded them by the over-confidence of the old epidemiologists, it is due to something more that they maintain, and seem likely to extend, their ground. They all, whether they deal in terms of medical history, of physical chemistry, or of coefficients of correlation, agree in two fundamentals. The first is that it takes something more than a bacillus to bring into being an epidemic disease. The second is that those other factors, whether inherent in the structure of man or implicit in his environment, are capable of measurement and their conjoined effects capable of prediction. It is an easy thing to sneer at the man who loves to pore over the books of those who died in ignorance of our modern lights. It is easy to rail at the attempt to number and count the phenomena of life and to laugh at presumption which will essay to foretell the succession of diseases:

> "How do they call him? The sagacious Swede
> Who finds by figures how the chances prove,
> Why one comes rather than another thing."

But it has been by these means that all other sciences have developed, and we cannot doubt that in this way also knowledge of epidemiology will pass from a crude empiricism into a branch of exact science. No grosser mistake can be made than to confuse the familiar with the known. The relation between poverty and disease is familiar, but it is not known. For these and many other reasons, the attempt of the "new" epidemiologists to collect materials for the compilation of an exact natural history of disease, not narrowly restricting their field nor inquiring too particularly as to the specific differentiae of the disease, is, we believe, well directed. To resume the task of Sydenham armed with the tools which more accurate means of collecting and analysing data provide, is not a work of supererogation.

FINE ADJUSTMENTS.

IN his Association lecture to the Edinburgh Branch, published this week, Dr. Haldane recurred to a doctrine a particular application of which he had briefly discussed in a lecture printed in our columns of July 19th, 1919. In that lecture, dealing with the causes, symptoms, consequences, and prevention of anoxaemia—a condition in which the supply of oxygen to the tissues is insufficient—he marvelled at the extraordinary fineness of the adjustment determining the degree of activity of the respiratory centre. As he then pointed out, the haemoglobin in human arterial blood is nearly saturated with oxygen; in addition to this chemically combined oxygen a very small amount is present in free solution in the blood, and as the blood passes round the circulation this free oxygen is continuously given up to the tissues and replenished at the expense of the oxyhaemoglobin, the latter recovering its full complement in the lungs. In order that the normal state shall be maintained, the respiratory centre must be in a state to respond to its normal stimuli, the breathing must produce sufficient ventilation of the lung, the alveolar epithelium must be in good order, the circulation must be effective, and the haemoglobin normal. Investigations made during the war showed that irregular distribution of air in the alveoli, owing either to shallow breathing or to irregular obstruction of bronchi, was an important cause of anoxaemia; though some alveoli are over-ventilated, others are under-ventilated, and the net result is that the mixed arterial blood is insufficiently saturated with oxygen. The anoxaemia, not only of bronchitis, of emphysema, and of cardiac disorders, but, it would appear, of pneumonia also, is mainly due to this irregular distribution of air in the lungs, a fact which accounts for the

striking effects of the continuous administration of oxygen in the manner described in the earlier lecture. It explains also how it comes about that on the occurrence of the crisis in pneumonia the rapid shallow breathing ceases, though the consolidation remains. It might have been supposed that arterial anoxaemia must result from a large amount of venous blood passing through the consolidated lung without being oxygenated, but, as the clinical observation last mentioned indicates, and as Professor Meakins has shown by *x*-ray photographs of injected lungs in pneumonia, the circulation in the consolidated parts is almost entirely blocked.

The main topic of Dr. Haldane's Edinburgh lecture, however, was, as has been said, the quite extraordinary accuracy of the adjustments in the living body. He illustrated this further by a relation of some recent observations on the regulation of the renal excretion. The kidneys like the lungs regulate the composition of the blood. When a large quantity of water is ingested the response of the kidneys is so immediate that if the body is already fully supplied with water, only an extremely small dilution of the blood is produced—a dilution so small that special methods of great delicacy must be used for its detection. By withholding water the excretion of urine is diminished, and the body weight may thus be reduced by several pounds; when water is again taken freely the body weight rises, but so soon as the normal is reached any more water ingested is promptly excreted. There is thus a well defined normal threshold for water in the blood beyond which it is excreted; the use of the word "threshold" to express the stage or level at which some change occurs is happy and its application to the ratio of water in the blood picturesque. A threshold may be raised or lowered by disease, and the modern treatment of diabetes depends largely upon the recognition of the fact that the threshold for sugar which has been lowered may, by suitable dietetic treatment, again be raised. So also in respect of the maintenance of the alkalinity of the blood there is a very well defined threshold below which acid urine is excreted, while above it the urine is alkaline. It is easy to see how ideas of this order will help to an understanding of what is happening in disease, and, it may be hoped, to more effective treatment.

Some of the observations on the regulation of blood composition related by Dr. Haldane have not hitherto been published, and they will, we believe, be read with great interest. He and Dr. Douglas devised a method of investigating the gases of the mixed venous blood returning to the heart in man; by its use they found that during complete rest mixed venous blood is not only very steady as regards its gas content, but considerably less venous than has hitherto been supposed. They found also that the rate of the general circulation is faster than formerly calculated, so that a volume of blood equal to that in the whole body passes through the heart about every thirty-five seconds, or nearly two gallons in a minute. The manner in which the amounts of oxygen and carbon dioxide present in the general venous blood are maintained at constant levels is another striking example of accurate regulation.

We are so familiar with the fact that it is the nature of a living organism when deranged to return to the normal that we have ceased to wonder. If we see it in the striking adjustment which immediately takes place on over-exertion we see its slower operation in disease; it is, in truth, the *vis medicatrix naturae*. The investigations Dr. Haldane describes help us to understand how this healing force acts, and therefore how Medicine can hope to remove obstructions out of its way, but they do not explain what that force is. We cannot now attempt to follow Dr. Haldane in the speculations lightly referred to in his lecture and more fully set out in his recent book.

LORD MOULTON OF BANK.

LORD MOULTON, known far and wide when Mr. Fletcher Moulton as a great patent lawyer, died in his sleep after a busy day on March 8th, in his 77th year. He became a judge of the Court of Appeal in 1906, and Lord of Appeal in Ordinary in 1912, in which year he received a life peerage; for his services during the war he received the K.C.B. in 1915, and the G.B.E. in 1917. He was a Fellow of the Royal Society, and the distinction was not merely complimentary. We are indebted to Sir Walter Fletcher, F.R.S., Secretary of the Medical Research Council, for the following estimate of Lord Moulton's great service to science: The biographical notices of Lord Moulton of Bank which have recently appeared in the press have hardly done justice to his scientific abilities, and have almost wholly failed to recognize his personal contributions to the welfare and progress of medical science. No doubt this is to be explained in large part by his sudden and wholly unexpected death, which allowed little time to current journalism for the examination of the public and private work he did in scientific fields outside his long and distinguished professional career during peace, and apart from his special services to the country during the war as Director-General of Explosives Supply. Yet the lustre of his more familiar achievements at the Bar, on the Bench, and in the Ministry of Munitions, should not be allowed to obscure the brilliance of the service he gave at every opportunity to the best interests of British medical science. He followed with close interest all the chief developments in the growing branches of physiology and pathology that contribute to medicine, not in vague and desultory admiration, but in steady pursuit and appreciation by a mind subtle, highly trained, and well stored. For the intellectual pleasures thus received he repaid the general cause of medical research by numerous and willing services of his own. Any science must gain if it has the steady sympathy of a man filled with expert knowledge of its methods, its results and its needs, who occupies a high public position. Few public and powerful men have even elementary knowledge of any natural science, and fewer know the roads by which all sciences advance. Lord Moulton in unnumbered ways was able to help the medical sciences by his advocacy and his influence, and to enlarge the general appreciation of them. He gave direct help besides to many special medical causes. He was much concerned, for instance, in the development of the inoculation department at St. Mary's Hospital, and Sir Almroth Wright has acknowledged his debt to Lord Moulton for some at least of the "phylactic" terminology now current in the study of the protective responses of the body to invasion. In particular it will be remembered how valuable and widely effective was the evidence given by Lord Moulton before the Royal Commission upon animal experiments—perhaps one of his most brilliant pieces of pleading. In this he irresistibly exposed the essential cruelty of those who, by opposing animal experiments, were impeding the diminution of the total sum of animal and human suffering. It was largely in recognition of his many services to medical science that he received his honorary doctorate at Cambridge on the occasion of the opening of the new School of Physiology by H.R.H. Prince Arthur of Connaught in 1914. In 1913 Lord Moulton was appointed to be the first Chairman of the Medical Research Committee (now Council), and he held that office until 1916, when he was led to retire by his increased duties in the Ministry of Munitions. He maintained up to the last the keenest

personal interest in the work of the Council. During the first critical year of its existence the Committee held weekly meetings in his house, and under his guidance laid down the broad principles upon which that new venture in the relations of science to the State was to be guided. It is well known that he brought to this work by no means only the general authority and support of the lay chairmanship commonly expected from an eminent man set to preside over a committee of experts. His familiarity not only with the content of scientific knowledge, but also with the daily realities of the laboratory and of the ward, greatly enriched and steadily guided his influence. This may perhaps be traced especially in the success with which that early committee approached certain vital problems that seem now in retrospect to be less formidable, perhaps, than they were at that time and until the war had brought home to the country the place and power of which research work should have been possessed long before. Among these may be mentioned the problems of obtaining reasonable security of tenure for scientific workers, and Ministerial approval for it, when the only available funds had nominally only an annual sanction; or, again, of widening the scope of reference to "medical research" so as to include that work in primary sciences for which much of pathology waits in need, and from which strictly utilitarian results in the long run may be expected with more confidence than from direct frontal attacks upon particular morbid processes by *ad hoc* research. For all these services of his to medical science, though they were but the parerga of a crowded and laborious life, the medical profession must always lie in heavy debt to Lord Moulton. Personal dues of affection and regard are owed to him by many individual members of the profession and by many scientific workers, who drew encouragement and inspiration from the subtle play of his critical insight, given freely in private talk or emerging with easy opulence among the catholic charms of his remarkable conversational powers, never shown more effectively than in the circles he delighted in drawing together to enjoy his genial and unmeditated hospitality.

AIR AMBULANCES.

IN the JOURNAL of December 13th, 1919 (p. 785), we recorded the views of the famous French surgeon, M. Tuffier, on the value of aeroplanes in military surgery, arising from his experiences on a professional visit to see a wounded French general in Southern Morocco. The patient had been brought by aeroplane for surgical treatment from a distant outpost over the middle Atlas mountains and over regions occupied by hostile tribes to a hospital in a large military station. In the south of Algeria and Morocco and in the Sahara the French army, owing to the conditions of the country and the nature of the military operations, had been led to make considerable use of aeroplanes for the transport of the wounded also. M. Tuffier was shown a machine specially constructed for conveying two wounded men, but it was not found very satisfactory, owing chiefly to the difficulty of lifting the patients in and out of the fuselage. The French military authorities have been giving careful study to the designing of special aeroplanes for transporting wounded, which would be of particular value in such frontier operations as those in their African territories. The Canadian Army Medical Corps also made some experiments in designing a similar aeroplane, but we have not seen a report of their result. Nearly three years ago the Medical Department of the United States Army undertook to prepare plans for the construction of air ambulances. Messrs. Vickers, Ltd., have now, we learn, constructed an aeroplane ambulance, modified from the "Vickers Vimy Commercial" type of aeroplane, which seems to be a great advance on anything that has previously been achieved. This machine is capable of carrying a crew of two, two attendants (for instance, one doctor and one nurse), and four stretcher cases or eight sitting cases, at a speed of 109 miles an hour for five hours, without a stop. Two Napier "Lion" engines of 450 horse-power each are installed, and all parts of the aeroplane, other than the fuselage, are interchangeable with the ordinary service type "Vimy." The two pilots are accommodated side by side in the pilots' cockpit in the nose of the aeroplane. The stretchers are fitted on one side of the cabin so that there is adequate clearance space, and the stretcher racks can be folded up out of the way when seating accommodation is required. Medical equipment up to 105 lb., stores to 200 lb., and a water tank for medical purposes holding 165 lb., are also carried, as well as the engine necessities. A wireless equipment is provided; there are special cooling arrangements for tropical climates, and adequate lavatory accommodation is provided. Under the pilot's seat in the front of the cabin there is a door which allows of the loading and unloading of the stretchers, so that the possibility of congestion, and turning of corners and similar rough treatment of the patients, is eliminated, while further door space is provided for rapid evacuation in case of emergency. The lessons of the "side-shows" of the great war must not be forgotten, and in the military reorganization of our African colonies, Mesopotamia, and India there is a wide field for the employment of ambulance aeroplanes, which could effect large economies by cutting down the number of outlying military hospitals at present necessary. The excellent photographs of the Vickers aeroplane ambulance that we have seen suggest that it provides a most comfortable, even luxurious, mode of transport for the wounded.

TRYPANOSOMIASIS RESEARCH.

DIFFERENCES of opinion which existed with regard to the means which could be taken to check the spread of trypanosomiasis in Africa led the Colonial Office to appoint a Departmental Committee, which reported in May, 1914. The Committee agreed that the proposed experiment of removing wild animals from a selected area might produce valuable information, both as regards the habits and the extent of the infectivity of the fly, and the degree of infection of man or stock derived from wild animals. The Committee, however, laid more stress on the need for further investigation. The outbreak of the war prevented any action being taken on this report, but the increase of sleeping sickness in certain of the French equatorial colonies and also in the Belgian Congo led the French Société de Pathologie Exotique to appoint a committee under the presidency of M. Laveran. The report of this committee, which was adopted by the French Colonial Minister, attached particular importance to the administration of atoxyl, with the object of destroying the flagellates in the blood of all infected cases. This, it was recognized, would involve a large personnel in all infested districts to detect and treat the infected. Though the extermination of glossina was regarded as impossible, it was thought that something could be done to remove the natives from areas chiefly frequented by the fly and to protect them against bites. At home the Secretary of State for the Colonies applied to the Imperial Bureau of Entomology, which appointed a special Glossina Subcommittee. The report of this committee begins by observing that the tsetse flies of the *Glossina morsitans* group range over very wide areas of tropical Africa. In Southern Rhodesia, where the fly-belts are comparatively small, their extent has been estimated at 9,000 square miles. In Northern Rhodesia it would, it is said, be difficult to find a continuous area of fifty square miles free from *G. morsitans*, except on the plateaus. Probably more than a fifth of Nyasaland is infested by tsetse flies, and the fly-belts cover nearly half Tanganyika territory. The need for more knowledge of the habits and life-histories of the flies and of the factors which favour their increase or inhibit their spread is insisted upon; even in

respect of *G. morsitans* there are many important gaps in knowledge, while practically nothing is known about *G. pallidipes* and *G. longipalpis*. Of the methods suggested for the eradication of the tsetse flies, the five principal are: wholesale destruction of the larger mammals; the clearing of all small trees and undergrowth; the continuous capture and destruction of the flies on a large scale; the eradication of natural breeding places, and the provision of artificial ones from which the pupae would be regularly collected, the flies emerging from them being killed and any parasites released in order that they might be bred on a large scale. All these proposals are condemned on the ground that it is impracticable to carry them out effectively over large stretches of country, though they might be effective in limited areas, as seems to be proved by experience in the island of Principe in the Gulf of Guinea. The report emphasizes the necessity for further study of the bionomics of the insects and more thorough surveys of the areas. The report was discussed at two meetings of the Royal Society of Tropical Medicine last autumn. Professor Warrington Yorke, who introduced the discussion, criticized it from several points of view; while he held as strongly as the subcommittee that further investigation was necessary, he pleaded for concentration of effort, urging that the work of entomological, medical, and veterinary research into the trypanosomiasis problem should be combined under one central organization in Africa, and be supported by contributions from all African states interested. Professor Yorke maintained that the personnel of an investigation commission should be large enough to ensure continuity of work, and that it should have sufficient funds to allow of the employment of adequate native labour for investigations on a sufficiently large scale, especially as to the dependence of fly and trypanosomiasis on game. Professor Yorke's views came in for a good deal of criticism during the discussion. Dr. Guy Marshall, one of the members of the subcommittee, maintained that it would be better to establish experiment stations in a number of different parts of Africa rather than to concentrate all efforts in one place; there were at least four species of flies of major importance, and the life-histories of each required further elucidation, as did also the influence of varying local conditions on them. Dr. Marshall also defended the committee for looking at the matter mainly from the entomological standard. The conclusion that the subject must be studied from every point of view, the medical being as important as the entomological, would seem to be the chief outcome of the discussion.

HYDROCEPHALUS IN ACHONDROPLASIA.

THE large head of the achondroplasiac has been long recognized as characteristic, forming a vivid contrast with the short arms and legs and stunted stature which complete the picture. *Post-mortem* examinations of the skull have revealed a tri-basal synostosis, resulting in shortening of the cranial base, with consequent brachycephaly and recession of the bridge of the nose. This smallness of the cranial base does not in itself account for the largeness of the head. Dr. W. E. Dandy[1] points out that the enlargement of the cranial capsule is not relative but absolute, the heads of these people being of the hydrocephalic type. He notes that whilst accounts of the architecture of the skull in these cases are not lacking, practically no attention has been paid to the condition of the enclosed brain. It has, however, been noted previously that the intellect of these persons is inversely proportional to the circumference of the skull. Jansen,[2] whose work on achondroplasia is well known in this country, has actually noted hydrocephalus in two cases. Dandy's interest in the subject was stimulated by a patient in the Johns Hopkins Hospital who presented the anomalous picture of a cranium larger than normal but a defective mentality. As almost the only thing which can cause the head to enlarge, and at the same time reduce the mental capacity, is hydrocephalus, Dandy set about obtaining a ventriculogram. He withdrew a quantity of cerebro-spinal fluid by a puncture of the posterior horn of the lateral ventricle, and injected an equal amount of air. Radiography demonstrated an enormously distended ventricle, the picture being one pathognomonic of hydrocephalus. Mental impairment is not universal in achondroplasia, at least in its earlier stages. It is difficult to understand precisely why hydrocephalus should develop in this affection. Dandy inclines to the view that the crowding of the base of the brain causes narrowing of the arachnoid cisternae, or that there may be a kinking of the iter. He admits that this is pure hypothesis, and we must await further investigations.

[1] W. E. Dandy, Hydrocephalus in Chondrodystrophy, *Johns Hopkins Hosp. Bull.*, January 5th, 1921.
[2] Murk Jansen, *Achondroplasia—its Nature and its Causes*, London, 1912.

"AESTHESIOSCOPIA ABDOMINALIS."

A SCANDINAVIAN worker, Dr. T. B. Wernöe, has described a method for detecting areas of hyperaesthesia in the skin of the abdominal wall.[1] The method depends on the observation that when warm skin is cooled it becomes paler owing to reflex vaso-constriction; in the presence of hyperaesthesia this reflex is exaggerated, and an area of hyperaesthesia exposed to the air becomes paler than the neighbouring parts. The difference is not very marked in bright illumination; but if the abdomen is turned away from the light and a little time is allowed for the reaction to develop and for the observer's eye to become accustomed to the dim illumination, the difference between hyperaesthetic and normal areas will be sharply defined. Compared with pinprick methods of testing for hyperaesthesia, this method has, it is said, the advantages of greater rapidity, accuracy, and objectivity. The author reproduces figures showing the shape, size, and distribution of the areas of hyperaesthesia mapped out by his method, and he regards it as applicable to intrathoracic conditions, such as pericarditis, as well as to abdominal and pelvic conditions. Hairy and pigmented skin does not show the reaction well, nor does skin which is much exposed to the air. The author records a fatal case of traumatic ileo-caecal invagination in which the site of the intestinal obstruction was clearly indicated by aesthesioscopia.

[1] *Ugeskrift for Laeger*, November 11th, 1920.

INDUSTRIAL WELFARE AND RESEARCH.

A YEAR or two ago a number of business men, who were faced continually with the effects of growing unrest and discontent in industry, came to the conclusion that the prevailing spirit was due largely to the lack of the old personal touch between employer and worker. It seemed to them that the industrial welfare movement provided both a valuable means whereby this link of friendship could be restored and a method of removing many of the causes of the trouble by showing to employer and worker alike their many common interests. In order to extend this movement the Industrial Welfare Society was formed, and its policy has been warmly approved by many hundreds of firms in which a better feeling between the workers and employers has been created. The growth of this society has been continuous, but in order to obtain the larger financial support necessary an appeal had to be made to the wider public. A conference on industrial welfare was therefore held at the Mansion House on March 2nd, and speeches were made by the Duke of York, Sir Charles Wakefield, and others. Before, however, there could be recaptured for modern industrial concerns the spirit of co-operation and fellowship that existed in the days of the old craft guilds between master and apprentice, there must be properly conducted research into the practical application of science to the human

conditions of modern industry. For this purpose has been founded a National Institute of Industrial Psychology, and the first meeting of its Council was held on March 3rd. The chairman, Mr. H. J. Welch, referred to the three branches of the proposed work of the institute—vocational guidance and selection, fatigue research, and movement study—the purpose of all three being the elimination of human waste and friction. The application of scientific knowledge to the human factor in work should not only increase production at low cost, but also add to the happiness and contentment of mankind. Mr. Welch explained that the main object of the new institute was to combine scientific research with practical work in commerce and industry; it was not established for profit, and all the fees received would be used to further these aims. Dr. C. S. Myers, F.R.S., Director of the Psychological Laboratory, Cambridge, who has been one of the moving spirits in the foundation of the institute, emphasized the necessity for careful research. An executive committee of the institute was thereafter formed, and also a scientific committee, including representative psychologists and physiologists. The office of the institute is at 329, High Holborn, W.C.

YELLOW FEVER IN NORTHERN PERU.

THE series of investigations into the etiology of yellow fever undertaken by Noguchi in South America, which has resulted in the description of *Leptospira icteroides* as the causal agent, has now been extended to Northern Peru by Noguchi and Kligler.[1] The *Leptospira icteroides* was first isolated by Noguchi from cases of yellow fever at Guayaquil in Ecuador, and subsequently from a case at Merida in Mexico; these strains were shown to be morphologically and serologically identical. Peru, which has suffered many visitations by yellow fever, was again invaded in June, 1919, and this outbreak had not disappeared entirely when Noguchi and Kligler arrived in March, 1920. The mortality was estimated at about 10 per cent., which is much lower than the 50 per cent. mortality in Guayaquil and Merida. Fourteen typical cases of yellow fever were studied in Northern Peru, nine in March, 1920, at Payta, where the laboratory facilities were very imperfect, and five in April and May at Morropon and Piura. A typical leptospira infection, together with the demonstration of the organism in experimentally infected guinea-pigs, was obtained in four, and in the majority of instances indications, such as fever, haemorrhagic areas in the lungs, and occasionally a suggestion of jaundice in the inoculated guinea-pigs, were observed; in a few cases only were the results entirely negative. The leptospira isolated from the Morropon cases of yellow fever was morphologically and culturally identical with the Guayaquil and Merida strains of *Leptospira icteroides*, and was shown by immunity tests to be indistinguishable from the Guayaquil strain. Study of the immunology of the Peruvian strains proved that the serum of patients convalescent from yellow fever at Payta, Morropon, and Piura gave a positive Pfeiffer reaction with leptospira strains isolated in Guayaquil and Merida, and in the majority of instances protected guinea-pigs from these strains. The virulence of the Morropon strains was approximately the same as that of those from Guayaquil and Merida. Suitable quantities of the anti-icteroid immune serum prepared with the Guayaquil strains administered to guinea-pigs inoculated with 2,000 to 20,000 minimal lethal doses of infective material prevented infection or death, according as the serum was given during the incubation period or after fever had appeared. Guinea-pigs from Payta were much more resistant to infection with leptospira than were guinea-pigs recently imported from New York. It was found that rabbit serum that had undergone long journeys in a tropical climate deteriorated as a culture medium for *Leptospira icteroides*, and that failure to obtain a growth in such serum occurred, whereas a growth was obtained with fresh rabbit serum; but the Peruvian strains had a tendency to degenerate early in culture.

[1] *Journ. Exper. Med.*, 1921, xxxiii, 239-260.

ARTIFICIAL LIMBS.

DR. GABRIEL BIDOU, who is known as an orthopaedic surgeon and an advocate of a system of artificial muscles for the instrumental treatment of paralysed and weakened limbs, has contributed a short paper to the Medical Society of the Paris Hospitals on the improvement of artificial limbs.[1] He complains that the limbs at present supplied are defective owing to their weight, the practical absence of support and of a proper seat for the tuberosity of the ischium. The result of the last two defects is that the stump is forced into the socket in an attempt to get support. Dr. Bidou does not say what the weight of any French limb is or should be, nor does he mention any average weight for any type of limb. It is therefore impossible to make comparisons between the limbs he criticizes and those of the Ministry of Pensions in this country. From such evidence as is available we are inclined to the opinion that our own official limbs are superior to the French, and probably to those of all the other belligerent nations. Although Dr. Bidou adversely criticizes willow-wood and raw hide sockets, he does not recommend any substitute, but he advocates the use of artificial muscles for the control of prostheses in a manner similar to that which he has recommended in his pamphlet on instrumental orthopaedics.

THE Senate of the University of London, on March 16th, adopted a resolution to continue the physiological laboratory at South Kensington until the end of the current triennium—that is, until the end of 1923.

A DINNER of congratulation to Professor Sherrington on his election to the presidency of the Royal Society was given by the Physiological Society on March 11th at the Café Royal, London. Professor Sir E. Sharpey-Schafer, who presided, proposed the toast of the guest, and his speech and Professor Sherrington's reply were the only speeches.

[1] *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris* (Séance du 3 Décembre, 1920).

PRESENTATION TO DR. J. A. MACDONALD.

THE following further subscriptions have been received from February 6th to 28th, 1921, in response to the appeal published in the JOURNAL of July 24th, 1920 (p. 129), towards a presentation to Dr. J. A. Macdonald on the occasion of his retirement from the office of Chairman of Council of the British Medical Association which he had held for ten years. Subscriptions of any amount not exceeding five guineas should be made payable to "The Macdonald Presentation," and sent to the Medical Secretary, British Medical Association, 429, Strand, London, W.C.2.

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Medical Notes in Parliament.

Criminal Law Amendment: The Bishop of London's Bill.

IN the House of Lords, on March 9th, the Bishop of London moved the second reading of a Criminal Law Amendment Bill based on that which he introduced last year. The earlier measure, a bill brought forward by Earl Sandhurst for the Government, and another by Earl Beauchamp, were referred to a Joint Committee of Lords and Commons under the chairmanship of Lord Muir Mackenzie. The report of this Committee, which contained recommendations to the Government, was published during the recess. The Bishop of London's new bill contains six clauses. Clause 1 lays down that it shall be no defence to a charge of indecent assault on a child or young person under the age of 16 that he or she consented. Clause 2 proposes to raise the age, in the sections of the criminal law relating to carnal knowledge of a girl from 16 to 17, and to repeal the subsection which makes "reasonable cause to believe that a girl was 17 years of age" a defence. It further proposes that the period within which complaint may be made shall be extended from six months to twelve. Clause 4 would heavily increase the fines and terms of imprisonment for brothel keepers. To relieve the bill of controversial matters the bishop left out of it any proposals to deal with the communication of venereal disease, the compulsory detention of young girls in homes, the prevention of prostitution in flats, and the former clause for the protection of boys. He explained that the reason why he now asked for the age of consent to defilement to be raised only from 16 to 17, and not to 18, was that Lord Muir Mackenzie's committee did not favour raising the age. Moreover, he thought that raising the age one year, with repeal of the subsection allowing reasonable belief as a defence, would mark a great advance. The bishop quoted from a report as to the conditions of London not yet published by the County Council. This showed that in the clinics of London (and only about one-tenth of the cases went to these clinics) there were 27,364 new cases in 1919, and 298,066 attendances. In the London Hospital clinic the numbers had increased from 658 new patients in 1918 to 1,452 new cases in 1920. These medical authorities reported in their careful summary that a large percentage of the patients was quite young—from 16 to 20 years of age. They said that seduction and desertion operated powerfully as a cause of prostitution. Referring to the proposals put forward by the Society for the Prevention of Venereal Disease for the distribution of packets and allowing chemists to sell preventives, etc., the bishop said he agreed with the late Lord Downham when he said that if this sort of thing really came to England it would be the beginning of the end. Coming to the work of the National Council for Combating Venereal Diseases, the bishop thought that its progress must necessarily be very partial and slow. In answer to the argument for licensed houses, he commended for attention Flexner's work on *Prostitution in Europe*. It had been proved that in every capital in Europe venereal disease had increased in almost exact proportion to the extent that the system was introduced.

Lord Onslow (for the Government) stated that, in view of the differences of opinion in the Joint Committee on the Government's bill of last year, it would not be reintroduced. The bill now presented by the Bishop of London omitted the most highly controversial matters, and the Government regarded it sympathetically, and would, if it progressed without material change, consider whether time could be found for it in another place. As for the age of consent, the Government bill proposed to leave it at 16; but the Home Secretary considered that the balance of opinion, in view of the further arguments, was for raising the age to 17.

Lord Phillimore, after reminding the House that he had sixteen years' experience as a judge of assize, gave his reasons for holding that if the subsection as to reasonable cause to believe were taken away the age should not be raised to 17, but ought to be reduced to 15. If the subsection were retained, the age might, he thought, be raised to 17. The Earl of Malmesbury, speaking as a member of the Joint Committee, held that the age should, with the removal of the subsection, be kept at 16. Lord Coleridge, recalling, like Lord Phillimore, assize experience, thought that if the raising of the age to 17 were accompanied by removal of the reasonable belief ground of defence, Parliament would be going beyond public opinion. Viscount Cave said he would rather have the clean cut—retain the age of 16, and abolish the particular defence, than raise the age and leave the defence standing. He said this with twenty years' experience as chairman of quarter sessions, and from what he had learned from London magistrates when he was at the Home Office. Lord Gorrell supported the bill as it stood, emphasizing the amount of support it had behind it from organizations.

Lord Dawson of Penn concurred with other peers as to the gravity of the evils, but feared that in some respects the bill would not succeed in removing the evils they greatly desired to remove. He did not say that the bill was not a good one; but there were certain respects in which it was liable to do harm. As to Clause 1—consent no defence in indecent assault cases—it was, he thought, necessary to distinguish between the sexual instinct which was based on nature and the sexual instinct which was unnatural and perverted. He took it that this clause was mainly directed against the older offenders—men and women. Misdoings of that description could not be dropped on too heavily; but the clause seemed to him to include the possibility of bringing into its meshes the young, and possibly the boy of 18 accused of an offence against a girl of 15 or 16. It seemed to him that such offences were on an entirely different footing. That was the natural instinct which overflowed at an age when restraint was deficient. Such young people did not require the dock. They rather required education, uplifting and moral suasion. He suggested that some proviso should put them on a different footing from the older offenders. On the question of the age of consent for carnal knowledge from 16 to 17, Lord Dawson assumed that when the Legislature raised it to 16, the view was taken that the young person of 16 was too immature to be what he might call "a conscious sexual instigating agent." But after 16, the changes taking place in a girl were often very rapid, very capricious, and very marked. It was quite easy to select five or six girls at the age of 17 who could represent by appearance any age from 15 to 21. It was the fact, therefore, that after 16 the girl was apt to develop very quickly and with that development became a conscious sexual agent. That was where his difficulty lay in raising the age. He was anxious to give all the protection that could be granted; but the moment the girl became a conscious and often an intentional instigating agent it seemed to him extremely difficult to throw the whole blame for sexual misdoing upon the man. The girl became jointly to blame with the man with whom she offended. It was a curious fact that the large body of public opinion which was constantly maintaining that there should be an equal standard of responsibility for the two sexes—a view with which he had considerable sympathy—should now be willing to protect the girl at the expense of the man. Example after example could be quoted where the girl could be the prime offender, and vice versa. It did not seem right to him to throw the whole onus on the man. He wished it to be clearly understood, however, that he was not concerned with the older man. The older man of 25 had developed a certain amount of stability and was quite capable of forming just opinions. There was another point of view which made one hesitate about placing responsibility for sexual intercourse exclusively on the male. Certain physical realities of life seemed to have been almost entirely ignored by many earnest social reformers. Coming down to consider the elemental things of life, it would be agreed, as to the instincts that moved men and women in sex matters, that the first outstanding instinct of the male was pursuit. It might be checked in civilized society by moral and religious ideas; but it was elemental. The instinct of the female was resistance and reserve, followed, it was true, by surrender; but, broadly speaking, she had the reserve, the resistance. That physical instinct was the basis of woman's modesty. Of all the forces that existed anywhere for sexual morality the most potent individual force was woman's modesty. The second point he wished to bring out, viewing the matter from the point of view of physical realities, was that the desire of the woman was much more conditional than it was with the man. The average woman had to love before she had passion, or, at any rate, she had slowly to develop a strong liking for an individual before that passion was aroused. She had none of the promiscuous qualities of the male, and unconsciously or consciously her sexual instinct was associated with the conception of maternity. She was therefore much more protected by Nature than the male. The ordinary girl of between 16 and 17, if reasonably brought up, had a much greater natural defence than the male. That raised a doubt in his mind as to throwing the whole responsibility on the male. Either the age must be left as it was or both male and female must be made responsible before the law for illicit sexual intercourse. With regard to brothels, he entirely agreed that the heaviest possible penalties should be put on the proprietors of places where proprietors farmed the earnings of women who resorted to them or where such women lived or resorted. But he had an apprehension whether, if legislation were too repressive, so that small hotels conducted in an orderly manner were brought within the law, the base of promiscuous intercourse might not thereby be further widened—driven into the back rooms of restaurants, into tea-rooms, into dancing places, and even into the homes. For that reason caution was required. He should not like it to be thought he was taking up an attitude of no action. Many provisions in the bill could be supported with confidence. But he did not believe that the problem of promiscuous intercourse was going to be met by legislation. It was going to be met by social reform and betterment; by encouraging community life such as was exemplified in the idea of garden cities, larger recreation grounds for the people, and the better education of youth. These were the remedies, it seemed to him: facilities for earlier marriage, the return to the larger family, and the frank recognition that if people were going to marry they must have control over the output of their offspring.

Lord Muir Mackenzie said that the bill—as far as it went—coincided with the recommendations of the Joint Committee, except in raising the age of consent to 17. The Committee agreed on the age of 16 and to get rid of the defence of "reasonable cause."

The bill was read a second time.

The measure was taken in Committee in the House of Lords on March 15th. The Bishop of London announced that, having regard to the discussion on the second reading of the measure, he was willing to accept an amendment, standing in the name of Lord Muir Mackenzie, which would retain the age of 16, but provide that reasonable cause to believe that a girl was over 16 years of age should not constitute a defence. He believed that by getting rid of that ground of defence there would be a great gain of protection for young girls; and, if the

measure passed through their Chamber as an agreed bill, there would be a greater possibility of its being accepted in another place. Lord Muir Mackenzie afterwards moved to substitute for Clause 2:

"Reasonable cause to believe that a girl was of or above the age of 16 years shall not be a defence to a charge under sections 5 and 6 of the Criminal Law Amendment Act."

This was accepted. The Lord Chancellor moved a new clause repealing the present law under which proceedings under the Incest Act are held in camera. This also was agreed to.

The Increase of Cancer.—In reply to Mr. Gilbert, on March 9th, Dr. Addison said that an extensive research into the causes of cancer had for some time past been undertaken by the Imperial Cancer Research Fund, and the Medical Research Council was facilitating research into the possibilities of radiotherapy and had been the means of providing a substantial quantity of active radium salts for the purpose. Cancer research funds were relatively well supported from voluntary sources, and he did not think that the issues were sufficiently clear for him to recommend grants in aid of the cost of the treatment of this disease at the present time.

Malaria Cases in Great Britain.—Captain Elliot asked, on March 9th, whether, in consequence of the number of men in this country who still suffer from malaria contracted abroad during the war and of the abundance of mosquitos present in many parts of England, malaria was now occurring in the civil population. Dr. Addison replied that the action taken was fully described in two separately issued reports on malaria contracted in England relating to 1917 and 1918 respectively, and in the annual report of the chief medical officer for 1910–20. The policy of prevention was based primarily on securing the early detection of all cases and carriers of malaria and arranging that the cases were thoroughly treated with quinine, thus removing, or greatly lessening the risk of infection if they were bitten by mosquitos which could spread the infection. Efforts were made at the same time to protect all such cases and carriers against mosquito bites as far as possible. Special supervision for these purposes had been arranged in the Isle of Sheppey, where most of the infection arising in England had occurred. The measures taken had greatly lessened the risk of spread. The total number of locally contracted cases reported among the civil population in England was only 32 in 1920, as compared with 93 in the previous year.

Lunacy Act Terms.—Dr. Addison stated, on March 10th, that he was in sympathy with the spirit of the resolution passed by the Committee of Visitors to the Isle of Ely and Borough of Cambridge Mental Hospital, that the terms "pauper lunatic" and "pauper lunatic asylum" should be discontinued, and that the terms "patient" and "mental hospital" should be substituted. The change, however, would require considerable amendment of the Lunacy Act, and he feared that words substituted would tend to acquire the same associations.

The Dental Bill.—Dr. Addison stated, on March 10th, that he hoped to confer shortly with the various representative organizations concerned with a view to the introduction of the Dental Bill as an agreed measure, but he was not at present in a position to name any date for the introduction.

Tuberculosis Treatment.—Dr. Addison assured Sir Arthur Holbrook, on March 9th, that the question of adequate and permanent representation for the members of the Insurance Committees upon the new Committees to be appointed on the transfer of tuberculosis treatment to County and Borough Councils was being borne in mind by him in regard to coming legislation.

Ministry of Pensions Expenditure: The Medical Services.—In answer to Lieut. Commander Kenworthy, on March 7th, Mr. Macpherson replied that the expected total annual cost of administration of the Ministry of Pensions for the current year approximated to £6,500,000; of that amount £3,000,000 related to general administration, £2,300,000 to medical services, and £1,240,000 to local war pensions committees. The number of persons (excluding widows, children, and dependants) in receipt of pensions on August 1st, 1920, was 1,117,000, and on February 1st, 1921, it was 1,060,000, and the respective annual costs thereof £61,598,000 and £60,484,000. The annual expenditure incurred in respect of medical boards was £1,712,000, the cost in salaries and fees to medical officers being £994,000. There were 564 whole-time medical officers employed on August 1st, 1920 (215 being engaged in institutions), and 592 employed on February 1st, 1921, of whom 257 were engaged in institutions. The number of disabled men who were in receipt of pensions on August 1st, 1920, and had now ceased to draw pensions by reason of death, being settled by gratuity or a final weekly allowance in lieu of pensions, and of their disability having become less than 20 per cent., was 103,000. The number of 20 per cent. and 30 per cent. pensions in payment at February 1st, 1921, was 390,000 and 245,000 respectively. Lieut. Commander Kenworthy also inquired what parliamentary authority there was for the constitution of medical boards composed of three medical men. Mr. Macpherson, in reply, referred to the agitation which led to the formation of such boards.

Pensions Appeal Statistics.—Mr. Macpherson, at the instance of Mr. Cape, stated, on March 8th, that the number of appeals heard by the pensions appeal tribunals between February 28th, 1920, and February 28th, 1921, was 14,487; of this number 4,384 were allowed and 10,103 were rejected.

Health of Soldiers at Cologne.—Lieut.-Colonel Buckley asked the Secretary for War, on March 8th, whether his attention had been called to the grave allegations concerning the Army of the Rhine made by the Rev. W. Talbot Hindley, a chaplain of the Territorial Force; and, in particular, whether there was anything to justify the statements that the conditions of life in Cologne made a death-trap for our soldiers, that 95 per cent. of one unit had been through hospital, and that there was a cemetery largely filled with suicides and victims of venereal disease. Sir. L. Worthington-Evans said that the Army Council was in communication with the reverend gentleman concerning these. There was no justification whatever for the statements attributed to him. During the period from January 1st, 1920, to January 31st, 1921, the monthly average of admissions for venereal disease was 1.4 per cent. of the total strength; there were 85 deaths from all causes, but none from venereal disease; 5 were due to wounds self-inflicted.

Dangerous Drugs in India.—Mr. Montagu informed Mr. Gilbert, on March 9th, that in India the regulation of the traffic in and use of dangerous drugs is controlled by a variety of local and Imperial Acts. It is believed that the law and practice in India in respect of such drugs are entirely in accord with the provisions of the Hague Convention. Some time ago, however, the Government of India was requested to look into the matter and to effect such amendments, if any, as might be required.

Insurance Committees and Medical Record Cards.—Replying to Mr. Bartley Denniss, on March 9th, Dr. Addison said that he had received representations as to the new medical record cards from only four Insurance Committees. In three cases the representations were on matters of detail, and in the fourth the Committee had resolved that the keeping of the records was desirable for securing a proper medical service. The Chairman of the National Association of Insurance Committees had written that the Executive Committee of that body held that the keeping of the records was unquestionably in the interests of the insured persons.

Termination of Sanatorium Benefit.—Dr. Addison, in answer to Mr. Wignall on March 8th, said that the date fixed for the termination of sanatorium benefit in England and Wales was April 30th next, and he was hoping to introduce shortly a bill dealing with the arrangements to be made for the treatment of tuberculosis after that date.

Wellhouse Hospital, Barnet.—In answer to Lieut.-Colonel Fremantle, on March 9th, Dr. Addison stated that a loan of £40,000 was sanctioned for the erection of Wellhouse Infirmary, Barnet, and £38,505 were raised by the guardians. The infirmary was opened only recently, and no figures of the running costs, or of the amounts recovered from persons relieved in the infirmary, had yet been returned. The clerk to the guardians reported that the staff numbered 36, and there were also two consultants.

Whole-time Medical Officer for Bromley.—Asked by Lieut.-Colonel James, on March 2nd, as to the proposed appointment of a whole-time instead of a part-time medical officer for Bromley, Dr. Addison said that the whole-time public health staff employed by the Bromley Borough Council consisted of two health visitors acting under the general supervision of the Medical Officer of Health. There were in addition certain officers employed on the school medical service. The appointment of a medical officer of health rested with the Borough Council, and the proposal to employ a whole-time medical officer of health came from them. In addition to performing the duties of medical officer of health, whoever was appointed would act as supervising school medical officer and be in charge of the maternity and child welfare of the borough. He was advised that the proposed arrangement would be economically useful, and did not see his way to withhold general approval of it.

Clinical Thermometers.—Mr. Kiley asked, on March 7th, whether a manufacturer of clinical thermometers was liable to be sent to prison in selling his products accompanied by a certificate that they had been tested unless the goods were sent to a Government department to be again tested. Sir P. Lloyd-Greame said that a seller had to comply with the Order in Council made during the war under the Defence of the Realm Act.

Glamorganshire County Asylums.—Dr. Addison, in reply to Mr. Stanton, on March 3rd, said he was advised by the Board of Control that an expression used by Mr. A. B. Marriott at the Merthyr Tydvil Board of Guardians on the previous Saturday, namely, that the patients at the Glamorganshire asylums were herded together, was not justified by the facts. The reports on the institutions which had been received did, however, indicate certain defects, and he was having the matter further investigated.

Answers in Brief.

The agreement for the supply by the Government of India of opium to the Government of Hong Kong has been renewed for a further period of five years, with certain modifications. Under the new agreement, which has effect from January 1st, Hong Kong will be supplied with ten chests of opium per month at a fixed price. No obligation rests on the Government of Hong Kong to take any prescribed minimum quantity.

Grants amounting approximately to £855,000 will be made during the current financial year towards the expenditure of local authorities on maternity and child welfare. The grants represent less than 1d. in the £ on the total sums voted by Parliament for the supply services of the country.

South Australia.

[FROM OUR SPECIAL CORRESPONDENT.]

MEDICAL LEGISLATION.

THE session of Parliament which has just closed has seen the enactment of several laws affecting, more or less, the medical profession. First and foremost the Venereal Diseases Act brings the State into line with the sister States of the Commonwealth. It provides for the treatment of patients either by a private practitioner or in a public institution until they have received a certificate of "cure" or of "freedom from venereal disease"; it prohibits any but medical practitioners treating such cases; it requires the practitioner to notify the Inspector-General of Hospitals of the case, without divulging the name or address unless the patient ceases to attend the doctor or institution, in which case his name and address is to be furnished. It provides for the education, by means of suitable literature, of the person infected, for the warning of the other party if marriage be contemplated, and it penalizes the individual who knowingly communicates any such diseases either in matrimonial or illicit intercourse. Another sweeping prohibition is that which forbids an infected person to work in any shop, factory, hotel or steamer, etc., in any capacity which involves the handling of food. There is a clause also which prohibits the obnoxious advertisements common even in respectable lay newspapers. Treatment is to be compulsory, and therefore, as a natural corollary, free treatment is to be provided; female sufferers may demand examination by a medical woman, if there be such a one, willing to act, and resident within twenty miles. The Act positively bristles with penalties, chiefly directed against medical practitioners, and ranging from a modest fine of £5 up to five years' imprisonment, with or without a mulct of £500. In considering the bill legislators seem to have been governed by the optimistic opinion of certain specialists, who asserted that these diseases might be exterminated; so they might, but we heard the same thing about tuberculosis five-and-twenty years ago. So far as the Act insists upon adequate treatment it is good, but the general opinion is that it will be found unworkable, and that it will be impossible to maintain the idea of secrecy; great and unnecessary hardships will, it is thought, be inflicted. What employer would take back the grocer's assistant or the restaurant waitress who has suddenly to vacate a position? It is asked whether the tests as to the existence of these diseases, and still more as to their cure, are absolutely trustworthy: whether, indeed, the correct principles of treatment of either syphilis or gonorrhoea are yet standardized. The almost universal prevalence of syphilis in some form was roundly asserted, and legislators were frightened by the statistics, and, withal, so innocent that one of them even thought that a doctor could determine freedom from venereal disease "in young girls" by a cursory examination consisting of lifting up an eyelid. Labour members especially were afraid that doctors would be bribed to give false certificates unless the fines were heavy.

THE OPTICIANS ACT.

The opticians have now obtained their wish. There is to be a "Board of Optical Registration"; it will consist of three competent opticians and two registered medical practitioners, and a majority of its members will be nominees of the Government. As, however, there is a suspicion that the Board may be boycotted by the doctors, provision is made for the whole Board to be composed of opticians. Paid examiners are to be appointed to examine budding opticians who aspire to practise optometry and to be registered as opticians. They are not to call themselves oculists, nor to use mydriatics, nor to prescribe for eye diseases. Another duty of the Board is to license spectacle sellers, but such vendors shall not aspire to practise optometry. Woe to the hawker who "peddles, barters," etc., spectacles. Master Moses Primrose will run no risk in future of being taken in by the itinerant vendor. The eye specialists opposed this Act on the grounds that the opticians who prescribe spectacles often overlook diseases of the fundus. Doubtless this is sometimes true, but the evil is probably exaggerated, and with the limitations prescribed by the Act it is difficult to see what greater harm will be done by registering them; doubtless also a tendency will grow to create a close guild of opticians.

NURSES' REGISTRATION ACT.

The examination and registration of South Australian nurses has hitherto been conducted chiefly by the Australian Trained Nurses' Association, which has its headquarters in Sydney, but probably in future this function will be taken over by the newly-appointed Nurses' Board of South Australia. There are to be three classes: ordinary nurses, mental nurses, and midwives. With respect to the latter the Board has power, in order to prevent the spread of diseases, to inhibit a nurse, registered or unregistered, from practising as a midwife, and after the expiration of a year no woman will be allowed to act as a midwife who is unregistered, emergencies excepted, such as a confinement occurring more than five miles from the nearest doctor or midwife. The other provisions of the Act do not call for comment.

Scotland.

WINTER CLINICAL MEETING OF THE EDINBURGH BRANCH.

THE winter clinical meeting of the Edinburgh and some other Scottish Branches of the British Medical Association was held in the Royal Infirmary, Edinburgh, on March 4th, and was in every respect most successful. The museum of pathological and other specimens, which was open all day in the pathological department, was visited by a large number of members. From 10 a.m. until 3.15 p.m. a number of demonstrations were given in the wards and special departments on, for instance, "Modern methods of treatment of syphilis and gonorrhoea," by Mr. D. Lees; "The colloid gold test for cerebro-spinal fluid in general paralysis of the insane and other disorders," by Miss Wilson; "The therapeutic uses of radium," by Dr. Dawson Turner; "Cases illustrating a new method of treatment by tuberculin," by Sir Robert Philip, and others by Dr. J. V. Paterson and Dr. A. H. H. Sinclair, Dr. Hope Fowler and Dr. A. McKendrick, Dr. Chalmers Watson and Dr. Lipschitz, and Dr. Norman Walker. At the clinical demonstration in the evening the large surgical theatre of the infirmary was almost filled. Dr. J. J. Graham Brown, president of the Branch, was in the chair, and a large number of interesting cases were shown by members of the medical and surgical staffs of the Infirmary. At 5 p.m. an address was given by Dr. J. S. Haldane, F.R.S., of Oxford, on "Some recent advances in the physiology of respiration, circulation, and renal excretion," which was listened to with very evident appreciation; the address is published in this issue of the JOURNAL (p. 409). In the evening a dinner was held in the Caledonian Station Hotel, which proved to be a most enjoyable function, although the number present was rather less than last year. Among the guests, besides the Chairman of the Scottish Committee and the Scottish Secretary of the Association, were Sir Robert Philip, President of the Royal College of Physicians of Edinburgh, Dr. George Mackay, President of the Royal College of Surgeons of Edinburgh, one of the Presidents of the Royal Medical Society, and one representative resident from the Royal Infirmary. The honorary secretary of the Edinburgh Branch, Dr. John Stevens, must be congratulated on the continued success of the annual winter clinical meeting.

Ireland.

THE DUBLIN ASSOCIATED HOSPITALS.

THE accounts of the fête held at Ballsbridge last October were presented to a council meeting of the Dublin Associated Hospitals Fund at the Royal College of Physicians on March 10th. The gross receipts amounted to £19,684; after paying expenses, the net balance was £15,655. The Lord Chancellor (Sir James Campbell), who presided, said that the result might be regarded as satisfactory, although some hospitals might have done better. Sir Patrick Dun's Hospital headed the list with £2,305, the Meath Hospital came next with £1,986, Steevens's Hospital third with

£1,632, and the Royal City of Dublin Hospital fourth with £1,527. Changes had been made in the administration of the hospitals in Dublin which he hoped would relieve the public to a large extent of the perpetual appeals for assistance. Arrangements had been made for a better system for paying patients and for obtaining contributions from the poorest; in the future the county councils would bear a fair share of the expenses incurred by the hospitals in treating the inhabitants of their districts. Most of the county councils had admitted the claims of the hospitals in a generous spirit. Sir Henry McLaughlin, the honorary organizer of the fête, said that the general position of the Fund was unsatisfactory. The total amount of the collection over and above the balance from the fête was £19,200; of this about £10,000 had been raised in country districts; about £9,000 had been subscribed by Dublin citizens. Plans which they had for a winter campaign had to be given up owing to the curfew orders. Professor James Craig, President of the Royal College of Physicians, proposed the following resolution, which was carried: "That the effort being made to remove the debts from the Dublin hospitals is worthy of the consideration of the business and commercial interests of the city." He said that, if the hospitals were not supported, either the hospitals must close or they must come under State or municipal control, either jointly or separately. If the latter alternative came, it followed that the hospitals would probably be under different management. There would be democratic control, and democratic control, he believed, would in this case be a mistake. He hoped the business and commercial men would see to it that the Dublin hospitals did not come under either State or municipal control.

Correspondence.

X-RAY RADIATION AND CANCER.

SIR,—The letters of Dr. Hernaman-Johnson and Dr. Mitchell require an answer, as they preach a pernicious doctrine. They seek to substitute a new and untried method, claiming to be based on certain animal experiments, for a treatment that has been worked at for years, the limitations of which are known, a treatment which has given steadily improving results as the doses and the penetration of the rays have been increased. The Erlangen method is a development on lines along which I have been striving to advance for many years, but have been prevented by inadequate apparatus. Whether one treatment will ever be sufficient to destroy a carcinoma is doubtful. The Erlangen school use two in carcinoma of the cervix, only they say that one is for the cervix and the other for the parametrium. I have not yet had an opportunity of investigating this treatment on the spot, but the theory is sound, though it is almost certain that the results will not be as good as is claimed. The method is bound to be a dangerous one, as great accuracy is necessary in the directing of the beams of *x* rays.

I for one will assert that *x*-ray treatment of carcinoma of bone—though one rarely gets a chance of treating this condition—has immeasurably improved in the last few years, together with the radiation treatment of all other deep-seated malignant growths.

Why should the experiments be ignored which show that radiation of a malignant growth will, if sufficient, prevent its implantation into another animal, and, if enough, but not too much, radiation has been given, will immunize the animal in which it is implanted? The experiments mentioned in the paper by Professor Russ and his colleagues were irradiation *of the whole animal* at a considerable distance from the tube, so far that to get a similar result on the much bigger human being the *x*-ray source would have to be at the other end of a long room. It is even possible that our radiations of a local growth, with its consequent irradiation of a comparatively small section of the body, may have a similar effect to these doses on the whole body of the small and easily penetrated rat. The experimenters with small doses have never claimed more than that in a larger proportion of the irradiated animals than in the controls the growth did not "take." In a quite considerable percentage the growth did "take."

I see many cases where insufficient irradiation has failed or has even apparently stimulated a growth and yet which, when large doses are employed, show marked and rapid improvement.

The treatment has its limitations; not all types of growth are suitable. At the same time it is not all growths which are stimulated by insufficient irradiation, but I have seen a few cases in which this has apparently occurred—only a few, as I take care to give large enough doses.

As to combining radiation treatment with surgery, the proper method is first of all to give a thorough irradiation to prevent implantation of cancer cells, taking care not to injure the skin; next to excise the growth as thoroughly as if no radiation had been used, and then to do prophylactic treatment.

I am convinced that the future in radiation treatment of malignant disease lies in more penetration and bigger doses.—I am, etc.,

London, W., March 14th. N. S. FINZI.

SIR,—Dr. William Mitchell asks whether the statement so often made "that weak doses (of *x* rays) stimulate malignant growth" is one of the "myths" that are constantly copied from one writer by another or whether there is any evidence, experimental or otherwise, to prove it.

I think I may be in part responsible for the statement, for in my Hunterian Lecture[1] on *x*-ray cancer and the conditions that precede its onset, delivered in 1909, I brought forward the results of experiments on rats and rabbits that appeared to afford unmistakable evidence of the stimulating effect of small doses of *x* rays upon *normal* epithelial structures.

It obviously would be a matter of extreme difficulty to furnish experimental evidence of any value in regard to a similar effect upon malignant epithelium owing to the impossibility of setting up a fair standard of control. But it is noteworthy that the epitheliomas of the skin of *x*-ray operators, which constitute the only known examples of the experimental production of cancer in man, would appear in the majority of cases to have been occasioned by oft-repeated casual doses, resulting from lack of protection and not by a massive and at once injurious dose.

It is also, I think, worth remembering that the effective dosage delivered by any stream of *x* rays must at some point in its passage through the tissues become a small one, dependent, of course, upon the various technical details concerned in its production, and upon the degree of absorption by the tissues through which the stream is passing.—I am, etc.,

London, W., March 14th. CECIL ROWNTREE.

SIR,—In the discussion of this important matter, it is necessary to avoid misconception. Dr. William Mitchell, in your issue of March 12th, makes the following statement: "I have seen it too often to have any doubt on the subject that operation for mammary carcinoma, of even the most favourable type, and done in the most thorough manner by the most capable surgeons, is followed in *a large percentage of cases* [the italics are mine] by rapid dissemination, which I am sure could have been averted by pre-operative treatment" (that is, *x*-ray radiation). Dr. Mitchell's experience must have been singularly unfortunate, and I venture to think unique. Every surgeon has probably met with early cases of cancer which appeared very favourable for radical operation; yet the operation proved a disappointment, and rapid dissemination supervened. But, apart from Dr. Mitchell's unfortunate experience, to imagine that this occurs in a large percentage of cases would surely be a gross misconception of fact. It is surely and fortunately quite a rare event. Whether in these cases a pre-operative course of *x*-ray radiation would have prevented its occurrence is difficult if not impossible to prove.

My objection to the pre-operative *x*-ray radiation of cancer is that it keeps the patient dallying with his disease, encouraging him in his natural desire to avoid operation by a seeming or real improvement in his condition, losing time which may mean him losing his life. When the certainty of cancer exists the sooner it is removed the better, and I should require much more convincing proof than the *ipse dixit* of the radiologist that he was sure that rapid dissemination could be prevented by a

[1] *Lancet*, March 20th, 1909.

course of pre-operative *x*-ray radiation before advising a patient to postpone operation for operable cancer a single day. On the other hand, I have for many years past advised my patients to undergo a course of post-operative *x*-ray radiation. There are these clinical facts about cancer: In some cases where the local origin is quite insignificant there is a great tendency to rapid and wide dissemination, and that quite apart from any operative procedure whatever. In other cases where the local origin is extensive the disease seems to expend itself locally, and the tendency to dissemination is much less. That is, so far as I know, one of the mysteries of this mysterious disease. That is why it is always worth while to remove cancer, however extensive, provided there is a reasonable chance of getting the palpable disease away. The most apparently hopeless case of carcinoma of the breast, from the point of view of prognosis, that I have ever operated upon—a young woman with a large and rapidly growing medullary carcinoma filling the breast, and secondary glands as large as walnuts in both the axillary and supraclavicular regions, advised, and apparently justifiably advised, against operation by a very eminent London surgeon—sent to me by Dr. H. W. Jeans of Portsmouth, is alive and well now, ten years after operation. In this case, wishing to give her every loophole possible in an apparently forlorn hope, I removed both her ovaries as well. Whether this had anything to do with the result of the operation I do not know. But the next case in which I tried it had a very rapid recurrence. The vagaries and uncertainties of this mysterious disease are untold, and conclusions and generalizations are apt to be consequently fallacious.—I am, etc.,

CHARLES P. CHILDE, B.A., F.R.C.S.

Portsmouth, March 14th.

CHRONIC RETENTION OF URINE ARISING FROM PROSTATIC DISORDER.

SIR,—I doubt whether Mr. Herbert T. Herring has told quite the whole story in his interesting paper (March 12th, p. 376). How does he account for the increased frequency of micturition which is a marked symptom of enlarged prostate long before there is anything like 10 oz. of residual urine? I believe the symptom is common before there is any residual urine at all. A majority of men over 60 pass water two or three times each night, which means that they can only hold some 5 or 6 oz. with comfort. It is not overflow from a distended bladder, for a catheter shows little if any residual urine. He says "prostatic resistance is generally augmented by enlargement." Why, then, does the subject of commencing enlargement pass water more frequently? He ought to have to wait until the "tonal bladder pressure" is sufficient to overcome the increased prostatic resistance.

One practical question for the practitioner is, When ought he to insist on passing a catheter? Should he insist if the urine is normal but passed only 3 or 4 oz. at a time, or should he wait until there are some signs of retention? The passage of a catheter is not devoid of danger.

Mr. Herring's treatment seems to me a bit risky. It might be done in hospital, but it would be dangerous in private practice, and a terrible ordeal for both patient and medical attendant. If the catheter is left to the patient "a breakdown in the technique adopted with regard to the preparation and passing of the catheter" is almost certain. The timing of the catheter would be difficult, for the secretion of urine is extremely irregular. Some nights a patient will secrete 20 oz., and on others as little as 4 oz. Most patients would prefer an operation, even a dangerous and tedious one.

If the practitioner succeeds in so increasing the muscular strength of the bladder as to overcome the increased prostatic resistance, surely he is dangerously near the production of back-pressure with fatal results to the kidneys?—I am, etc.,

O. CLAYTON-JONES, M.B.Oxon.

Silverton, nr. Exeter, March 14th.

THE DROOPING SHOULDER SIGN OF PHTHISIS.

SIR,—Let me reply briefly to the little discussion of the paper entitled as above. The first participator says I mention Krönig, but not his "isthmus of resonance." Hardly necessary, perhaps, for that is by way of being a classic sign, and every recent textbook, British or other, has it.

The second gives a British book in which, he states, the drooping shoulder phenomenon is fully described. I fear I cannot agree. There is no mention of *unilateral* drooping. What is described is sinking of both shoulders due to the long familiar fact that the *thorax paralyticus* has a position of expiration. Nothing is said of one scapula lying lower than its fellow, nothing of this asymmetry being probably due to the atrophic trapezius allowing it to sag; nothing of the probability of such atrophy being an end-stage of Pottenger's muscular spasm and subsequent pulpy degeneration; nothing of the smaller nipple on the affected side confirming the theory of nervous origin of the atrophy by pointing to a possible trophic influence. As there are four lines on lowering of the nipple I do not think the author can have read Krönig's untranslated little masterpiece in the *Deutsche Klinik*, or his ready mind would have appreciated the precedence given there to the drooping scapula over the lowered nipple. In this exegesis I am confirmed by his own entry into the discussion. He talks only of lowering of the external end of the clavicle, which he now associates with advanced or extensive disease, citing Walshe to the same effect. Thus it might now possibly be unilateral, although we are left in the dark as to that; but there is nothing even implicit to be gathered as to a connexion with muscular atrophy. In truth, changes in thoracic conformation from advanced lung disease are another thing altogether: witness the frequency of shoulder drooping with clinically early lesions or with the hilus affection of children. Since the bibliography of his book has not a single reference to a German or Austrian paper in the original, while, on the other hand, nearly a third of the articles in it are by Scotsmen, one of them mentioned repeatedly, my withers are not sore under his strictures as to authors and nationalities proper to quote. For my part, I cited the chief relevant writers—Krönig, whom we have heard about; Bandelier and Roepke, the English translation of whose book is on every tuberculosis officer's shelf; Schröder and Blumenfeld, authors of the fullest work on phthisio-therapeutics in existence; and the American Pottenger, whom my third critic also cites. To *approfondir* a subject one must forget geography, and that mendacious goddess Politics.

The fourth one, I fear, with every wish for an amicable summing up, I must characterize as another confuser of *thorax paralyticus* with a unilateral phenomenon; as is surely plainly apparent. Even if he were not, two words are a smallish basis for a priority claim. We are not all as easily satisfied as M. Jourdain was when they told him "Bel Men" meant such a lot of things.

The "drooping shoulder" seems always to excite interest. Readers might therefore care to turn up *Tubercle* for July, 1920, where I have traced the analogy with muscular spasm and atrophy in osseo-articular tubercle, and in some cases of scrofula.—I am, etc.,

Barnsley, March 11th. W. C. RIVERS.

THE CURE OF HAEMORRHOIDS WITHOUT OPERATION.

SIR,—I fear I must ask you to allow me to trespass upon your space again in order to reply to Dr. Lyth's letter in the JOURNAL of March 12th. I do not know whether to take his opening remark, in which he accuses me of being a physician and not a surgeon, as a compliment or the reverse, but it is typical of the inaccuracy of observation which he shows all through his letter.

Dr. Lyth admits that my views as to the essential differences between external and internal haemorrhoids are assumed by most authors. But he goes on to quote from Walsham and Spencer's book on *Surgery* to prove that "most authors" are incorrect. This little students' book is hardly one to which to refer in a scientific discussion, and Dr. Lyth is forced to make a very "tall" assumption to support his theory that an internal pile may be converted into an external one. The quotation to which he refers is merely to the effect that some piles are "covered in part with skin and in part with mucous membrane." I cannot see why Dr. Lyth should assume from this that the authors meant to imply that internal piles may ever become completely covered with skin and shift their base from above the anal valves to

the skin outside the bowel, which is what he has to do to show that internal piles may become external. He goes on to mention that Keen describes skin-tags as "false piles," and asserts that these skin-tags are "cured" internal piles. I think that most authors—and certainly most authors of books on rectal surgery—are agreed that these skin-tags result (1) from thrombosed external piles, which have subsided, and (2) from the subsidence of oedematous folds of skin around the anus, which are so commonly associated with—but which are altogether separate from—strangulated prolapsed internal haemorrhoids. Over and over again I have seen these oedematous skin folds appear after carelessly performed stretching of the anus, and also in cases of semi-strangulated prolapsed piles. These piles can be reduced in most cases, but after their reduction the swollen folds of skin remain, and, after the inflammation and oedema have subsided, they remain as skin-tags. The internal piles remain also (unless operated upon or otherwise treated), and it is obvious, therefore, that the tags are not the external "remains" of internal piles, because the internal piles are still there also.

I can assist Dr. Lyth when he wonders what an "internal pile outside the anus still covered with mucous membrane and yet cured, looks like and feels like." An internal pile cannot be outside the anus covered or not with mucous membrane and yet cured. Its cure can only be assumed when no pile can be seen *inside* or outside the anus on examination with the speculum and otherwise. The subject of his bewilderment is a confusion of ideas and a contradiction of terms.

It may be that Dr. Lyth has watched more cases of piles than I have, but in view of my three years' experience in the out-patient department of St. Mark's Hospital, and a private practice which has included a very large proportion of rectal cases—and especially of cases of haemorrhoids—I am disposed to doubt it. I have seen skin-tags arise over and over again in the ways I have described above, and most writers on rectal surgery describe the same processes; but I have never seen an internal pile acquire a skin-covering and an external attachment, nor can I find any writer, other than Dr. Lyth, who has observed such an extraordinary process. When Dr. Lyth goes on to inform us that the glans penis in the uncircumcised is covered with mucous membrane, one realizes that his powers of observation are not very accurate!

I should not have thought it necessary to assert again that internal piles which have never prolapsed may give rise to serious symptoms, had not Dr. Lyth tried to prove the contrary. It is useless for him to repeat his statement that "so long as it is inside and remains inside—even during defaecation—it does little harm." I assume that internal piles inside the anus may bleed, because I have seen them, with the aid of a speculum, actually bleeding and the blood collecting inside the rectum—and this not seldom but very commonly. Such bleeding piles are often far too small to reach down as far as the anus, and when the patients assure me they have never prolapsed, I prefer to believe these patients and my own eyes rather than Dr. Lyth's very dogmatic contradictions.

I cannot follow Dr. Lyth's argument about the shape of the stomach as seen in *x*-ray examination, because I cannot see what it has to do with what Dr. Lyth assumes is the normal prolapse of the rectal mucosa during defaecation. I have sat behind a horse and am well aware that in that animal there is some prolapse of mucous membrane from the anus during defaecation; but the human rectum does not prolapse during defaecation in a normal individual, though of course piles often do prolapse during defaecation and become reduced spontaneously. In fact, I make a note in every case as to whether the piles are spontaneously reducible or have to be reduced digitally. It is unnecessary to give a patient an enema and to make him strain in the squatting position to demonstrate the presence of piles, if one possesses and knows how to use a good speculum. This process of enema and the squatting posture, suggested according to Dr. Lyth by Keen, has obvious disadvantages in private practice, especially if the patient is a lady. I fancy a speculum gives more accurate results and less offence to delicacy.

Dr. Lyth next asks how a pile can bleed externally in any quantity unless prolapsed. It cannot do so, but it frequently does bleed into the rectum in large and even dangerous amounts. I have seen cases where the accumulated blood has acted as an enema and has been expelled suddenly together with faeces, leaving the patient almost pulseless. And yet in some of these cases the piles had never been down and could not be forced down by straining, even after the enema that was necessary to get rid of the remainder of the blood and faeces in the rectum, and so to inspect the piles *in situ*. Certainly in cases where the piles do prolapse and where bleeding takes place outside the anus, the blood is often small in amount and arterial in colour—in fact, the bleeding is nearly always from small arteries. Dr. Lyth will assuredly come across cases in which there has been no temporary prolapse and there has been serious bleeding nevertheless.

Dr. Lyth charges me with distortion in stating that a patient who has undergone his treatment must afterwards wear a pad and powder the piles frequently. I made no such statement. Quoting from his article, I said that on his own showing it will be some six weeks before the piles can be spontaneously reduced, and that—again according to Dr. Lyth—only then will he be in a fair way towards being "cured." I went on to write: "Meanwhile, and even afterwards, he has to wear a pad, to powder his piles frequently . . ." If Dr. Lyth will refer to his paper he will see that he wrote that it would take two or three weeks for the piles to be sufficiently shrunken to return inside the bowel during the night; after a further lapse of two or three weeks the prolapse is so readily reducible that he may dispense with the pad at night, and he is "then in a fair way to being cured . . . and he is wise to have calamine and a pad available." I do not think that what I wrote is a distortion of this description, but I do think it is a distortion on Dr. Lyth's part to try to make me out as having said that the pad and calamine must be used after the end of the treatment—presumably ever after; I said no such thing, and therefore plead not guilty to the charge Dr. Lyth makes against me.

On the other hand, I for my part accuse Dr. Lyth of distortion of my description of the results of the treatment by injection when he says that I implied that the result as far as symptoms are concerned is not instantaneous. I wrote that in the very large majority of patients both bleeding and prolapse have disappeared from the moment of the first injection. My criterion of the *cure* of piles is not their disappearance from view into the rectum and the cessation of symptoms, but the complete absence of piles on inspection of the interior of the rectum with a speculum. To ensure this, an average of four injections at weekly intervals is necessary; sometimes one attains this result with two and sometimes as many as six are necessary. Dr. Lyth calls a *maximum* of six "injecting for an indefinite period," and tries to make out that the symptoms continue all that time, which, as I have said, is a distortion of what I wrote.

A very conservative estimate of the number of injections I gave at St. Mark's Hospital would be 1,500, and I suppose that I have treated not less than 1,000 cases in my private practice. Amongst these there have been no cases of pyaemia or of hepatic abscess, and I have not heard of any case of this sort in the practice of others. I have heard of pyaemia in cases treated by operation in the old septic days, and also of cases of abscess and pyaemia following upon sloughing of strangulated piles, left untreated or "treated" without reduction by so-called palliative measures. I can well imagine that if injections were given with septic instruments and without careful attention to details such complications might arise; but the same may be said of operative, palliative or any other treatment. I may add that I have many times treated patients by injection after several unsuccessful operations by other surgeons, and that some of these were included amongst the 83.4 per cent. successful injection cases of over three years' standing to which I referred in my former letter.

Let me ask Dr. Lyth to get a Kelly's speculum and examine some of his so-called cures with it in order to ascertain whether they still have piles or not. Let him also give us some figures as to the number of his cases and the percentages cured according to the criterion of whether they still have piles inside the rectum. This evidence is essential in order to form a judgement of the value of his treatment.—I am, etc.,

London, W.C., March 12th. ARTHUR S. MORLEY, F.R.C.S.

"CHANGE OF AIR."

SIR,—The very interesting article by Mr. Frank Coke in the JOURNAL of March 12th, and his demonstration that other things than air are involved in the therapeutic influence of what we call change of air, prompts me to recall a case I saw long ago. A lady under the care of Dr. George Hunter suffered from a chronic irritation on her hands which became intolerable but at once disappeared when he sent her away for change. She came home full of gratitude, but the rash began to develop itself again immediately. At this time *Primula obconica* was discovered (by Dr. W. G. Sym, I think) to be a cause of skin irritation, and Dr. Hunter found she had it in her greenhouse. He banished it, and she was free of the rash ever after. This was years ago, but I have always felt since that the easy ascription of disease to climate was a mistake, and that it was not climate, but associated agencies, which caused the so-called "climatic diseases," and I fancy every one thinks so now. Mr. Coke's research gives prospect of cure to many sufferers.—I am, etc.,

Southsea, March 13th. W. E. HOME, M.D.

RISKS AFTER OPERATIONS ON TONSILS AND ADENOIDS IN OUTDOOR CLINICS.

SIR,—I have been so interested in the correspondence in the JOURNAL on this subject that I cannot refrain from giving my experience in the special department of a London general hospital—Charing Cross—where the number of beds is seriously limited.

The following routine is adopted: Printed directions for the preparation for operation and treatment are given, and, if that indispensable hospital officer the almoner and her staff find that the patient's home is poor, unsuitable, and not within an easy journey to the hospital, admission is recommended. The operation is performed at 8.30 a.m., and while the child is being prepared the temperature is taken, and if it is above 99° F. operation is postponed. After operation the patient is kept warm and quiet until 12.30, and, if found well enough after inspection by the medical officer, a piece of gauze is fixed over the mouth and the patient sent home. In most cases the mother willingly spends a few shillings on a taxi. The use of an ambulance car was offered, but it was found to be impracticable, as the children lived at all points of the compass. A district nurse visits the patient next day when necessary.

We came to the conclusion that if these patients were to receive any benefit from admission, they must be kept in for at least three days, and it is better for the child to go home a few hours after operation than on the next day after it has had a restless night and the usual reaction with its accompanying temperature.

This routine has been carried out for fifteen years with such good results and without a single serious disadvantage that I am convinced that under the above conditions the hard-and-fast rule that all cases of this operation should be admitted is unsound and impracticable. The question of admission should be left to the discretion of the individual operator, who, with a little tact, can obtain any and every thing for his majesty the child.—I am, etc.,

London, W., March 11th. EDWARD D. D. DAVIS.

THE FALL IN THE TUBERCULOSIS DEATH RATE.

SIR,—It is to his little controversy with me that Dr. Davies's letter (February 26th, p. 322) refers. It is so earnest, and its fallacies so pathetic, that criticism may seem ungracious. But he will allow that truth is to be sought at all costs; and that a man may be seeking the same aims with himself who tries to find out what are the limits within which the State can do good, without which it must do harm.

He and I start from a common basis in regard to the effect on real wages of Insurance Acts and the like. As he implies, they lower them. But, he maintains, such measures may do much to stamp out phthisis.

It would be difficult to find a more crushing refutation of his position than has been afforded by the seven years 1913–1919. To begin with, destitution, on which he laid and lays much stress, was abolished during the war, and much diminished, as he said, before the war. The death rate went up. State agencies were working at the minimum of impediment up to 1915. The death rate rose. After that they worked with a gradual increasing impediment up to the maximum in 1918. According to the Registrar-General, but for the influenza epidemic at the end of 1918, it would have been obvious that the rate was declining in 1918; the decline was patent in 1919.

Dr. Davies rather plumes himself on his prophecy, vague and faltering though, on his own showing, it was. Let me tell him what were the prophecies of men of my school. In 1912 we predicted a rise in 1915, due to the Insurance Act. That came true. In 1915, seeing how money wages were outstripping prices, and assuming, as we had learned to assume, that the war would last for so long, we predicted a fall in 1918. The Registrar-General cannot be accused of standing on the same platform with me, and he says that prophecy came true also. If history goes for anything, the momentum of that fall will last another year or two. But the question of wage rate is to-day extraordinarily complex. No one can predict its course with any confidence. Personally I believe that real wages are falling, and must fall considerably in the near future. If so, one fears that we have to look to a rise in the rate in 1923.

But in any case the fall in 1919 (which is partly unreal, for clearly many deaths occurred in the last quarter of 1918 which normally would have fallen in 1919) of phthisis mortality is short of that of 1913. It is humiliating to find that we have made no progress in six years; nay, if I take a single year—namely, 1918 (as he does)—none in twenty-six years. But my point was, and is, the slackening of the rate of fall from 1895, since statesmen discarded Gladstonian finance. If the Gladstonian rate of fall had been maintained, in 1919 the death rate would have been some 400. It was some 1,000; and that only after a little jugglery.

I submit that there is only one possible explanation of the facts of the war—namely, the raised standard of living among the largest section of the community, the borderland class. I am constantly seeing statistics that show that after the momentum of the rise due, finally, to the Insurance Act, had died down, the insurance class of patient died less fast than before, though in 1917 and 1918 conditions were at their worst. On the other hand, classes which had been well-to-do had their standard lowered, and died faster. It is highly significant, for example, that half the increase in deaths in 1918, were asylum deaths—that is, of people who would not feel the fluctuations in wages rate, but would be specially obnoxious to debilitating influences, such as inferior food, though again they would be exceptionally fortunate in the degree of official supervision they enjoyed.

If Dr. Davies is to prove his point, it is imperative that he should adduce instances of a fall in the rate after a fall in real wages. I have sought earnestly and cannot find one, though I can show scores where a fall in rate has been heralded by a rise in wages, or a rise in rate by a fall in wages. All the benefits he aims at obtaining for the poorer classes—with the exception of the army of officials—come automatically if the rate of wages rises. Indeed, he himself lays stress on a raised standard of living. It plainly cannot be raised unless wages are also raised. The official naturally sees the result for good on individuals of measures of the kind we were discussing; he ignores, because he does not see, the results for evil on the mass. But we, who go habitually and intimately among the poor, know that for one relieved twenty suffer.

The State has had to compete with private capital for labour, and so wages have been raised by help of loaned capital to an undreamed-of height. That cannot go on. But the process can be wholesomely imitated, and in one way only—the way of Mr. Gladstone and the Manchester School. Let the State and municipality stay their mischievous hand.—I am, etc.,

Rayleigh, Essex, March 5th. B. G. M. BASKETT.

THE PREVENTION OF VENEREAL DISEASE.

Sir,—In considering this problem we cannot disregard the facility with which brothels are established and conducted in London.

As a member for six years of the Legal and Parliamentary Committee of the Council for this borough I realized (1) that this evil is extensive and carried on by

both women and men; (2) summonses, though supported by good evidence, were constantly dismissed by one magistrate, though the same class of evidence in another court secured conviction and a fine; (3) as a rule the punishment was inadequate—imprisonment was rarely inflicted, and only after a second conviction; (4) persons found guilty and evicted from one locality would later carry on the same vile occupation elsewhere; (5) many of the proprietors of such "disorderly houses" were aliens. Our council passed a resolution to the effect that increased penalties should be awarded for the offence, and that aliens found guilty should be imprisoned and subsequently deported. This resolution was sent to our senior M.P.

With regard to instruction of adolescents in this matter, as a mariner is not sent to navigate a dangerous coast without a chart so a warning should be given to the young at puberty of this peril in the voyage of life. A father cannot hurt his boy's sensibility by reading with his son the awful warning in Proverbs vii.—I am, etc.,

Paddington, W., March 5th. HENRY H. STURGE.

EPILEPSY CONSIDERED AS A SYMPTOM.

SIR,—In your issue of January 15th Dr. Alfred Carver relates two cases illustrating the psychic origin of some cases having the epileptiform convulsion as chief symptom. As a psychic origin would appear to be more common than was at one time believed, it is well that cases illustrating it should be recorded, and I add a few cases which have recently come under my observation in private.

Case 1.—A man, in easy financial circumstances, aged 32, married, with two children, was sent to me by his doctor. He complained of dizziness and "faints," with loss of consciousness or "fits" as his relations called them. He had been a lieutenant in a non-combatant corps; he had some months' service in France, and was "windy" more or less all the time, when a small piece of missile, hardly denting his "tin hat," supplied the final touch to his breakdown. In a hospital in France he, amongst other things, walked in his sleep, and he came to a neurological hospital in London while air raids were still common. Ultimately he rejoined his unit on home service and was in due course demobilized. After some time in civil life he began to have dizzy turns, and often, if he merely thought of getting a dizzy turn, he would get one, his face then becoming suffused. Periodically he would have what appeared to be a fit; he would fall down suddenly, sometimes without warning; this would be followed by amnesia for the whole affair and the events recurring thereafter. By the same methods as described by Dr. Carver, I found he had considerable amnesia for parts of his war experience, and in particular had repressed the memory of his "baptism of fire" and its "affect." This "affect" was liberated, not at the time of recovery from this amnesia, as one usually expects, but in a dream of the same experience, which I suggested he would have, that same night. Following that, he said he felt a different man, and so far as I know he has had no more fits, but should he have further secondary repressions they will have to be dealt with in the same way.

Case 2.—A machine gunner from a military family joined the army at the age of 16. He was an excellent fighter, covered with scars of wounds. At intervals, since he was discharged on account of wounds, he had had attacks which conform to most people's ideas of an ordinary epileptic convulsion with an aura; the fits occur at the same time of day as when he was wounded, just prior to his leaving the trenches for a rest, and the "aura"—a peculiar drumming noise in the head—is identical with the head noise which he experiences at the commencement of a fit. He was certified by a medical referee as suffering from epilepsy. Release of his repression, with an abreaction, has led to a cessation of his fits.

Case 3.—A young man, now aged 23, shy and reserved, during the stresses connected with puberty, about seven years ago, had what appeared to me to be an ordinary epileptic convulsion after an incident which strongly aroused his emotions. Since then he has had a number of such attacks at long intervals. He always gets them while at home, after emotional stress, such as a difference with his father, or the like. Although he has driven his father's cart through the streets for years, he has never had a fit under circumstances which would endanger his life. These facts would seem to point to a psychogenic origin of his fits, but I have had no opportunity of a psychological analysis.

Case 4.—A boy, now aged 6 years, an only child, very sensitive and with a strong imagination, was taken to a pantomime at the age of 3, and was frightened by an actor dressed up in a wild animal's skin. The following day he had a fit, in which he lost consciousness for a short time; his chin coming in contact with the table, was cut, necessitating a couple of stitches. He had many recurrences of these attacks resembling *petit mal*, during a year or more, the falls on the chin opening it several times. The parents, or rather neighbours, being restive, he was seen by a distinguished neurologist, and developed one of his attacks in the hall of this gentleman's house. He considered the attack to be, as I did, of the nature of *petit mal*, and prescribed a modern form of bromide medication, but after a couple of bottles the parents gave it up. I directed the father to find out if possible any incidents which had made a strong impression on the child's mind and to allay any fears connected therewith. The pantomime incident cropped up, and the father did as directed; whether this was *post hoc* or *propter hoc* I cannot say. Soon after, the fits entirely ceased; but when I happened to see the mother recently she volunteered the information that in the following year after the fits began the boy had gone to the pantomime again, and had a fit the following day.

In this last case the second pantomime revived the emotion connected with the first, and the dissociation of consciousness led to a fit on the following day. The main point for patient and parents is that the patient has had no fits for more than a year.—I am, etc.,

W. CAMPBELL ANDERSON,
Physician, Neurological Clinic, Ministry of Pensions, Cardiff; late M.O. Maghull Military Hospital.

Cardiff.

THE POSITION OF THE ARMS IN BREECH WITH EXTENDED LEGS.

SIR,—I have kept an account of my breech cases (hospital and private), 62 in number. Of these, 23 had extended legs, and in 15 of these the arms had to be brought down as they were extended also. In 11 the arms only were extended. I have found that there was no danger of the arms being extended by pulling on the breech, provided the pulling was done only during uterine contraction. I always verify the position of the arms when the umbilicus appears.

One interesting breech case with extended arms and legs had a spina bifida; first the legs and then the arms were brought down. There being no progress, the head was examined and found to be large. The cord had ceased to beat, and forceps applied to the after-coming head would not lock. In view of the probability of hydrocephalus, the spina bifida was opened, a catheter passed up, and the fluid from the head run out. The next uterine pain completed the birth without assistance.

Extended legs offer no difficulty, and need not be brought down in cases of sacro-posterior breech. I have watched four cases deliver themselves easily without help.—I am, etc.,

L. GORDON HOPKINS, M.D.Lond.

Westcliff-on-Sea, March 7th.

SIMPLE GOITRE IN SCHOOL CHILDREN.

SIR,—I agree with Dr. W. A. Lethem's statement (March 5th, p. 367) as to simple goitre in school children. For a number of years I have observed that a considerable number of children show evidence of slight deficiency of the thyroid secretion, either with or without coexistent enlargement of the thyroid gland. This enlargement when present is in many cases a compensatory one on the part of the gland to overtake its work, and subsides in many cases when tablets of thyroid extract are given.

Children Examined in Smethwick, 1920.

	Boys.	Girls.	Total.
Children examined	1,618	1,891	3,509
Enlarged thyroid gland	60	170	230
Showing symptoms of hypothyroidism without any definite enlargement of gland	13	24	37

In a junior technical school 260 boys between the ages of 13 and 16 were examined, and of these forty-eight showed enlargement of the thyroid gland and twelve had symptoms of hypothyroidism without enlargement of glands. It was noticeable that the majority of these cases were much undersized and invariably below the average in physique. As Dr. Lethem points out, the signs of mild hypothyroidism in children are difficult to detect unless they are looked for. If the diagnosis is correct these cases respond definitely and show improvement within three or four weeks on small doses of thyroid extract. I am accustomed to commence with the average child of 10 with gr. ½ three times a week, increasing as required. In these cases the mothers are urged to give the children plenty of vegetables and to steam them instead of boiling. In some cases where anaemia is marked or there is a scrofulous history, a few drops of tincture of iodine in milk is given.—I am, etc.,

J. BELL FERGUSON,
Medical Officer of Health.

Smethwick, March 7th.

Obituary.

ERNEST HOOK BUCKELL, J.P., M.R.C.S., L.R.C.P.,

Consulting Physician, Royal West Sussex Hospital.

DR. E. H. BUCKELL, who died at his residence in the West Pallant, Chichester, in his 69th year, was the second son of the late Dr. Leonard Buckell, of the same city, and came from a generation of members of the medical profession. He was educated at Epsom College, after which he had a distinguished career at University College Hospital, and obtained the diplomas M.R.C.S., L.R.C.P. and L.S.A. in 1875. Thenceforward he practised in Chichester and the district, succeeding his father as medical officer of the Bishop Otter Memorial College and of the Chichester Poor Law Institution. He enjoyed also an extensive private practice. For over thirty years he was honorary physician to the Chichester Infirmary, now the Royal West Sussex Hospital. On his resignation, in 1919, he was appointed hon. consulting physician. He founded the *x*-ray department at that hospital, and its present state of efficiency is due to his work of some years ago.

Dr. Buckell was a great supporter of the British Medical Association, and in the year 1919 was President of the Chichester and Worthing Branch, and as such entertained the members at his house in July of that year. As a colleague he was exceptionally agreeable. His sympathies were always extended to the poor people of the city, and on this account he will be greatly missed. His personal relief to people in the district was extensive and his devotion to duty was great. Dr. Buckell took a keen interest in public affairs, and was for many years a member of the City Council and also a Justice of the Peace for the city. His spare time was given up to carpentering, in which art he was an expert. To mourn his loss he leaves a widow and four daughters (one of whom married Dr. Walter Dick, who succeeds to his practice) and two sons, Dr. Ernest Buckell, who practices at Newport, Isle of Wight, and Dr. Aston Buckell, who is assistant bacteriologist at Durham University.

DR. HUGH A. MCCALLUM, Emeritus Dean of the Western University Medical School, London, Canada, died of pneumonia on January 25th after a brief illness. He was born near London, Ontario, in 1860, and was educated at the Collegiate Institute, St. Thomas, and at the Western University Medical School, from which institution he graduated in 1886, winning the gold medal. After acting as lecturer in biology for the session 1886–7, he proceeded to Johns Hopkins University, where he studied physiology under Newell Martin. On his return to his native town he was appointed professor of physiology, a position he held for the succeeding ten years. During this period he wrote extensively on physiological topics, his papers being marked by much originality and philosophic grasp. He was subsequently appointed to the chair of medicine and continued in that post until last year. In 1900 Dr. McCallum came to England and studied at various London hospitals, obtaining the membership of the Royal College of Physicians of London in the following year. In 1913 he was elected Dean of the Medical Faculty of the Western University, and under his influence the medical school entered on a new era of prosperity; full-time professors were secured for the laboratory departments, and the project for obtaining new buildings assumed definite form. The commodious and efficient medical laboratories now nearing completion represent the culmination of his efforts in behalf of medical education in Western Ontario. He was appointed emeritus dean in 1919. In 1901 he married Miss Mary Burnard; he is survived by his widow, three sons, and one daughter. The high regard in which Dr. McCallum was held, both professionally and personally, made him a great force, not only in his own community, but in Canada generally. His death was deeply mourned by people in all stations in life.

DR. DONALD JOSEPH MACAULAY of Halifax, who died on March 8th, received his medical education at the University and the school of the Royal College of Surgeons of Edinburgh. He took the triple Scottish qualification in 1890 and the M.D.Brux. in 1897. He was a native of the Outer Hebrides, but had resided in Halifax for thirty years, where he had a large practice and was greatly esteemed by his patients. He took great interest in the work of the St. John Ambulance Association, of which he was a life member. He was a member of the British Medical Association and had held the office of President of the Halifax Division. One of Dr. Macaulay's chief hobbies was to collect Whistler's etchings, of which he had an excellent collection. He is survived by his widow, three sons, and two daughters.

WE regret to announce the death from pneumonia, at the age of 67, of Dr. JOSEPH ERNEST BULLOCK, of St. Leonards-on-Sea, which took place at Northampton on March 4th. Dr. Bullock was educated at University College Hospital; he qualified M.R.C.S. and L.S.A. in 1878, and obtained the M.D.Brux. in 1880. He was subsequently resident medical officer at the Western Medical Dispensary, London, and house-surgeon at St. Peter's Hospital. After practising for many years at Ladbroke Grove, W., he took up the special study of tuberculosis, and he was for some time on the staff of the Eversfield Chest Hospital, St. Leonards-on-Sea. During the later years of the war Dr. Bullock was employed as acting tuberculosis officer for the county of Northampton. He translated Cornet's *Skrofulose* with marked success, and he wrote numerous articles which were published in the medical journals. He was recognized by all who knew him as a man of the highest character, with a kindly nature, and a varied and extensive knowledge of medical work.

THE untimely death of Captain (temporary Major) EDWARD RANDOLPH ARMSTRONG at Quetta at the early age of 36 removes from the I.M.S. one of its most capable and popular officers, and one who—health permitting—would have undoubtedly gained high honours and rank. Armstrong had a brilliant academic career. He took the Liverpool University M.B., Ch.B. degrees with honours in 1907, and subsequently the M.D. while at home on sick leave. In 1909 he took the D.T.M.Liver. and in 1910 the D.P.H.Camb. with "distinction" in three of the four subjects. Joining the Indian Medical Service in July, 1911, he won all the prizes open in his term to the I.M.S. and the I.M.S. and R.A.M.C. combined. At the beginning of the war he was invalided to England on account of ill health. Having been passed fit for duty in India—but to his sorrow not for general service—he returned to India in 1916, and was appointed D.A.D.M.S. (Sanitary) at Army headquarters. The work entailed by this appointment he carried out in a highly efficient manner for nearly four years. After a few months spent in England he was appointed D.A.D.M.S. (Sanitary) of the 4th Quetta Division, and took up his duties in December, 1920. A colleague writes: "Though a rapid worker everything he touched showed meticulous care. Often in ill health, he never allowed personal affairs to interfere with the strenuous and responsible work he was called upon to do. He never worried—difficulties only added zest to his work. Kind-hearted, generous, and lovable, the many friends to whom he endeared himself will long remember him."

THE death has occurred at Bratton, Wilts, of Dr. CHARLES A. GATLEY, at the age of 31. The son of Dr. H. R. Gatley, of Kingston-on-Thames; he was educated at Marlborough and Guy's Hospital, where he held the post of house-surgeon. On the outbreak of war he went as house-surgeon in charge of Mrs. Hall-Walker's (now Lady Wavertree) hospital at Regent's Park, and a year later went to France, attached to the East Kent Regiment. It was while at Cherisy that, in 1917, he was very severely wounded, and the results brought about his early death. He was wounded while going up to the firing line, because the stretcher cases were not coming down quick enough. In April, 1919, he entered into partnership with Dr. Trevor Shorland, of Westbury. Dr. Gatley was only recently appointed medical officer for the Bratton district under the Westbury Guardians, and was a member of the Pensions Board for Wiltshire. The burial took place at Bratton, Dr. Bond of Trowbridge representing the Wiltshire Branch of the British Medical Association.

THE death is announced at Ballarat, Australia, on January 24th, of Dr. WILLIAM MORRISON, youngest son of the late Mr. Donald Morrison, LL.D., a former Rector of Glasgow Academy. Dr. Morrison graduated in arts at Glasgow University in 1877, and in medicine in 1881, taking the degree of M.D. three years later. He was senior honorary physician of Ballarat Hospital, and physician-accoucheur to Ballarat Female Home. He held the rank of major in the Australian Army Medical Corps.

DR. JAMES ARTHUR WILLIAM CULLEN died at the British Station Hospital, Jhansi, India, on January 16th. He was educated in Dublin, where he graduated B.A., M.B., B.Ch., and B.A.O., in 1917, and immediately took a commission in the Special Reserve of the R.A.M.C., being promoted to captain on October 10th, 1917. He had served in India. On being demobilized last year, he entered the service of the Great Indian Peninsular Railway, and at the time of his death was district medical officer at Bina.

Universities and Colleges.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN Ordinary Council was held on March 10th, with Sir Anthony Bowlby, President, in the chair. Diplomas of Fellowship were granted to nineteen candidates found qualified at the recent examination. Licences in Dental Surgery were granted to thirty-eight candidates found qualified at the recent examination. Mr. H. J. Waring was appointed Bradshaw lecturer for the ensuing year.

The Dentists Bill.

The following report of the Dentists Bill Committee was presented to the Council:

As requested by the Council on February 10th, 1921, the Committee has taken into consideration the bill to amend the Dentists Act, 1878, presented to Parliament by Dr. Addison, and has consulted the Dental Section of the Board of Examiners in Dental Surgery in reference thereto. So far as the Committee has been able to ascertain, the bill, as a whole, is approved by most members of the dental profession. There is, however, one provision in the bill which meets with some amount of opposition—namely, the provision to admit to the *Dentists' Register* without any kind of test persons who for five years immediately preceding the commencement of the Act have been engaged in the practice of dentistry. It is strongly felt by many that no one, who has not passed some sort of examination as a test of fitness, should be put on the *Dentists' Register* itself, and that vested interests would be sufficiently met by placing those who have been in practice for five years or more on a separate list, appended to the *Dentists' Register*, with the title of dental practitioner, and with the right to pass to the *Dentists' Register* if they submit themselves successfully to the prescribed examination. At the same time it is recognized that it might be undesirable to adopt this course unless those placed on the separate list could be made subject to the same control as those on the *Dentists' Register* itself. There are some provisions in the bill to which the Committee thinks it desirable to call the attention of the Council. In addition to the fee for original registration, the Board which it is proposed to set up will have power to charge an annual fee, not exceeding £5, for the retention of a name on the *Register*. Further, while the actual order for the erasure of a name from the *Dentists' Register* will be made by the General Medical Council on a report from the Board, the inquiry in connexion with the removal from or restoration to the *Dentists' Register* will be held by the Board. As any name erased from the *Dentists' Register* on account of crime or disgraceful conduct must also be erased from the list of licentiates in dental surgery or dentistry of the medical authority of which such person is a licentiate, it follows that a licentiate in dental surgery of the Royal College of Surgeons may be deprived of his licence after judgement by this Board on which the College is not represented. As regards the constitution of the Board, the Committee finds that, as at first constituted, 9 of its 12 members will be appointed by Government authorities, and that both in its initial and its permanent form no representation is given to the medical corporations, and not less than one-half of the seats on the Board are allotted to representatives of Scotland and Ireland. The want of proportion in this arrangement may be gathered by reference to the official statistics published in the *Dentists' Register* for 1920, which show that 80 per cent. of the persons whose names are recorded in the *Dentists' Register* are graduates and licentiates in dental surgery of universities and colleges in the United Kingdom, and that of these approximately 50 per cent. have qualified in England, including 46 per cent. holding the licence in dental surgery of the Royal College of Surgeons of England, 21 per cent. have qualified in Scotland, holding, with two exceptions, the licence in dental surgery either of the Royal College of Surgeons of Edinburgh or of the Royal Faculty of Physicians and Surgeons of Glasgow, and 9 per cent. have qualified in Ireland, all but thirty holding the licence in dental surgery of the Royal College of Surgeons in Ireland. The Committee further note that the Board, both in its preliminary and its permanent form, is to contain three lay members, not being registered medical practitioners or registered dentists.

The Committee thought it desirable to call the attention of the Council to several points in connexion with the bill, but, while unable to regard it as entirely satisfactory, is not prepared to recommend the Council to endeavour to secure any amendments, in view of the general acceptance with which it appears to have been received by a majority of the members of the dental profession.

Election of Council.

A meeting of the Fellows will be held at the College on Thursday, July 7th, at 2.30 p.m., for the election of four Fellows into the Council in the vacancies occasioned by the retirement in rotation of Sir George H. Makins, G.C.M.G., C.B., Mr. J. Ernest Lane, Mr. H. J. Waring, and Mr. F. F. Burghard, C.B. Blank forms of the requisite notice from a candidate and of his nomination may be obtained on application to the Secretary, and the same must be received by him duly filled up not later than Monday, March 21st. A voting paper will be sent by post to each Fellow whose address is registered at the College, on April 5th. Fellows are requested to give notice, without delay, of any change of address, so that their voting papers may not miscarry. We are informed that Sir George Makins and Mr. Ernest Lane will not present themselves for re-election.

UNIVERSITY OF OXFORD.

Osler Memorial.—At a public meeting held in March, 1920, it was decided to raise a fund to establish a memorial to the late Sir William Osler, Bt., Regius Professor of Medicine in the University. The fund has now reached nearly £2,000, and a further list of subscribers will be published soon. Subscriptions may be sent to the Honorary Treasurer, Mr. A. P. Dodds-Parker, B.M., F.R.C.S., 2, Holywell, Oxford.

Diploma in Public Health.—The Board of the Faculty of Medicine gives notice that at the examinations for the diploma in public health in Michaelmas Term, 1921, and afterwards, the first part of the examination will comprise the application of chemistry and physics to general hygiene, and general pathology with special relation to infectious diseases. The second part will comprise practical pathology and bacteriology, general hygiene, the laws relating to public health, sanitary engineering, and vital statistics. The examination in Michaelmas Term, 1921, will be conducted in accordance with a time-table published in the University Gazette for March 9th, 1921 (Clarendon Press, Oxford, 3d.). The effect of this announcement is to remove from Part 2 to Part 1 the examination in systematic pathology and bacteriology, but to retain in Part 2 a practical and *viva voce* examination in those parts of the subject which are most closely related to public health.

Degree Days.—The following degree days are announced: Saturday, March 19th, at 10 a.m.; Thursday, April 28th, Saturday, May 21st, Thursday, June 16th, Thursday, June 23rd, and Saturday, July 9th, at 2.30 p.m.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

THE following have after examination been admitted as Fellows of the Faculty: S. S. Barton, R. T. Grant, N. Morris, J. Russell.

The Services.

THE following members of the Scottish Women's Hospitals for Home and Foreign Service have received the King's permission to wear decorations of the Order of St. Sava of the classes conferred upon them by the King of the Serbs, Croats, and Slovenes in recognition of their services to the Serbian sick and wounded in the late war:—*Fourth Class:* Miss Beatrice Anne McGregor, M.B., C.M. *Fifth Class:* Miss Lilian Mary Chesney, M.B., Ch.B., Miss Janet McVea, M.B., C.M., Miss Elizabeth Brook, M.B., Ch.B., Miss Catherine Louise Corbett, M.B., Ch.B., Miss Janet Stewart Laird, M.B., Ch.B.

DEATHS IN THE SERVICES.

LIEUT.-COLONEL ROBERT COBB, Bengal Medical Service (retired), died at Lincoln on January 15th, aged 68. He was born on May 10th, 1852, the son of the late Rev. T. Cobb, of Stockbury, educated at University College, London, and took the diplomas of M.R.C.S. in 1874 and L.R.C.P.Lond. in 1875, and subsequently

the M.D.Brux. in 1886. Entering the I.M.S. on March 31st, 1876, he became surgeon-lieutenant-colonel after twenty years' service, and retired on October 10th, 1906. His whole service in India was spent in civil employ in Bengal, where he held two of the most important stations, Patna and Dabha, successively, and also acted as Surgeon Superintendent of the Presidency European General Hospital, Calcutta. Some years after he retired from the army he entered the service of the British North Borneo Company, under whom he served as Principal Medical Officer and Member of the Legislative Council at Sandakan, the capital of the Protectorate. He had only recently retired and returned home.

Dr. William Frederick Abbott died at Clifton on February 28th, aged 63. He was educated at the Ledwich School, Dublin, and took the L.A.H.Dubl. and the L.R.C.S.Ed. in 1884. Before the war he was in practice at Clapham; he took a temporary commission as lieutenant in the R.A.M.C. on April 7th, 1915, becoming captain after a year's service, and acting major on March 29th, 1918; he was medical officer to the Military Hospital, Lewisham, demobilized a year ago.

Medical News.

ON the recommendation of the Minister of Health, the King has been pleased to appoint Mr. C. L. Forestier-Walker, M.P., to be a Commissioner (unpaid) of the Board of Control, in the place of the Right Hon. Sir W. H. Dickinson, K.B.E.

WE are asked to state that hospitals in the county of London, or within nine miles of Charing Cross, desiring to participate in the grants made by King Edward's Hospital Fund for London for the year 1921, must make application before March 31st to the Honorary Secretaries, 7, Walbrook, E.C.4. Applications will also be considered from convalescent homes which are situated within the above boundaries, or which, being situated outside, take a large proportion of patients from London. Applications will also be considered from sanatoriums for consumption which take patients from London, or which are prepared to place beds at the disposal of the Fund for the use of patients from London hospitals.

A SPECIAL post-graduate course adapted to the needs of the medical man in active practice will be held at the Prince of Wales's General Hospital, N.15, from Monday, April 25th, to Saturday, May 7th. It will include each day demonstrations of clinical and laboratory methods in the morning, and in the afternoon demonstrations of groups of selected cases, and either a clinical lecture or clinical consultation. Demonstrations will also be given in associated special hospitals. A syllabus, to be issued in due course, will be sent on application to the dean.

THE annual conversazione of the Middlesex Hospital Medical Society will be held at the hospital on Monday next, March 21st, at 8.30 p.m. Dr. Charles Singer will deliver an address entitled "Medicine in Ancient Greece."

THE list of products covered by the Dyestuffs (Import Regulation) Act, which has been drawn up in consultation with the Dyestuffs Advisory Licensing Committee, is now available and may be obtained on application to the Board of Trade, Industries and Manufactures Department, Great George Street, Westminster, London, S.W.1.

THE annual meeting of members of the Royal Medical Benevolent Fund will be held at 11, Chandos Street, W.1, on Tuesday, April 5th, at 5.30 p.m.

A SPECIAL meeting of the Röntgen Society will be held at Manchester, on Friday, May 6th, 1921, at 8 p.m., at the University, when Professor W. J. Bragg will deliver a paper and Professor A. V. Hill will give a demonstration of some electro-physiological experiments. On the following day it is hoped to arrange visits to works of scientific interest in the district. As this will be the first meeting away from London, it is hoped that as many members as possible will attend in order to make the meeting a success. The gallery of the Royal Photographic Society of Great Britain has been placed at the disposal of the Röntgen Society during June, when it is hoped that a collection of radiographs, illustrating the different practical applications of *x* rays, will be furnished by members of the Society.

THE Wellcome Historical Medical Museum will be closed for redecoration and cleaning from April 1st to the 30th, inclusive.

THE annual debate of the Chelsea Clinical Society, which had been fixed to take place this month, has been postponed till April 19th.

THE house and library of the Royal Society of Medicine will be closed from Thursday, March 24th, until Tuesday, March 29th, both days inclusive.

IN accordance with the terms of the will of the late Dr. Robert Thomas Nichols, the Royal Society of Medicine will offer every three years a prize of £250, open to any British subject, for the most valuable contribution towards the discovery of the causes and the prevention of death in childbirth from septicaemia. Work already published may be submitted provided that the date of publication is subsequent to June 30th, 1921. The first award will be made in 1924, and the application must reach the secretary of the Society not later than June 30th, 1924.

DR. H. E. DIXEY of Malvern, and Major J. R. Williams, T.D., have been appointed sheriffs for the counties of Worcester and Carnarvon respectively.

THE Colston University Society was founded twenty-two years ago, and on the incorporation of the University of Bristol in 1909 it was resolved to apply the funds of the Society to the support of research work within the University. In order to make it clear that the Society exists for the support of research work within the University, and that its funds are devoted wholly to this purpose, the title has now been changed to the Colston University Research Society.

DR. EDMUND BERANECK of Neuchatel, Switzerland, well known for his work on tuberculin, has recently died.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medissera, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

INCOME TAX.

"X. Y. Z." is a retired medical officer and possesses a house in Ireland. If he lets that house furnished for seven months of the year, or for the whole year, is he liable for income tax on his pension or colonial dividends, provided that he then lives outside the United Kingdom?

*** The facts are unusual, and the point arising does not seem to be precisely covered by a decided case. In our opinion "X. Y. Z." would be liable (*a*) in respect of income arising in the United Kingdom—for example, the profit on the furnished letting, and (*b*) on the amount of retired pay or colonial dividends remitted to the United Kingdom. Residence outside the United Kingdom, while another residence is not maintained there, would exempt our correspondent, but it is a settled principle of law that a man may have more than one residence simultaneously, and the possession and occasional use of a furnished house might constitute "residence" for the purpose of the Income Tax Acts.

SEA WATER FOR INTERNAL USE.

"MEDOC" writes: In answer to "Haloid's" query (March 5th, p. 369), there is a preparation of sea water, rendered isosmotic with the blood, which is sterilized and put up in sealed glass ampoules in various quantities. It is usually given intramuscularly, but can be taken by mouth, diluted with ordinary water. It is procured twenty miles from shore at a minimum depth of 30 ft. The sea water is sold by Messrs. A. Nelson and Co., 73, Duke Street, Grosvenor Square, W., and by Messrs. Sumner and Co., 40, Hanover Street, Liverpool. The former's supply comes from France and costs rather more.

LETTERS, NOTES, ETC.

WE mentioned last year the foundation of the Southend Doctors' Cricket Club. Dr. A. W. Holthusen, the honorary secretary, has sent us a report of the season, from which it appears that of the 5 matches played 3 were won. The programme for the coming season includes 10 fixtures.

HERPES AND VARICELLA.

"M.O.H." writes: The interesting correspondence as to the relation of these two diseases has not, so far as I remember, included a case where both affections appeared at the same time in one person. At the end of last summer I was asked to see a man with an eruption on his face which was supposed to simulate small-pox. He had arrived at the house sixteen days previously, and on the thirteenth day had a severe attack of shingles over the shoulder blade and extending around the armpit to the breast. The vesicles were already beginning to dry. On his shoulders, chest, legs, and arms were a very few typical chicken-pox vesicles; the eruption on the face, which was very thick, was just about to enter on the vesicular stage.

SUPERNUMERARY NIPPLES.

DR. EDGAR J. TYRRELL (London) writes: During the last twelve months in 1,000 consecutive examinations of adults I have noted six cases of supernumerary nipples. In one case there were two—one on either side. In the other five the occurrence was on the left side. I was struck by their appearing in men who were members of a small family, but whose parents, either one or both, were members of a large family (over five). I made the following notes:

P. F. T., aged 30. Only child of parents. Had two supernumerary nipples—one on either side.

A. H. M., aged 35. Had two brothers and one sister. Supernumerary nipple below left breast.

C. D., aged 39. Had one brother and one sister. Married nine years, no children. Father member of a large family, mother of a very large one. Had supernumerary nipple below left breast.

G. A. J. B., aged 37. One brother only. Father one of seven children, mother one of four. Supernumerary nipple below left breast.

W. H. B., aged 37. Had three brothers and four sisters. Both parents members of large families. Supernumerary nipple below left breast.

E. W. H., aged 32. Had three brothers. Father member of family of ten. Supernumerary nipple below left breast.

I was unable to ascertain whether there were any supernumerary nipples in parents. Most of my patients were unaware of the true nature of the occurrence, and thought they were moles. In every case they were quite rudimentary, but a typical small nipple was present, with a surrounding areola varying in size from a quarter to three-quarters of an inch in diameter.

I have evolved a theory in these cases which may be of interest. The grandparents had large families; this was borne out in all the cases which I investigated; in the first two cases I did not inquire. The parents had small families; this was apparent in five out of the six cases. The exception was in No. 5, in which case *both* parents were members of large families. It would seem as if Nature were making a special effort, in the third generation, to make up for the delinquencies of the second generation in the matter of propagation—by giving an accesory nipple to the male!

CEMENT AND CO_2.

DR. WALTER G. WALFORD (London, N.W.) writes: There is one thing that has occurred to me as regards the death of Mabel Weightman, recently found lying on some sacks of fresh cement in an unfinished house at Bushey, and where no apparent cause was discoverable. Many years ago a sack of fresh Portland cement was placed in a small outhouse in my premises. Next day I found a large healthy-looking cat coiled up, apparently asleep, on the top of the sack, but in reality dead. It at once occurred to me that as fatal results often follow, when people sleep in lime kilns, from the emanation of carbonic dioxide, that recent cement, which is largely a compound of lime, might give off small quantities of the same gas, and have asphyxiated the cat in its sleep. Now possibly the young girl may have gone into the probably unventilated room where the six sacks of cement were to wait for someone. If my supposition is correct, the CO_2 would make her drowsy. What, then, would be more natural than that she should lie down on the sacks and, finding her breathing difficult, loosen her corset? And this was how she was found. It would be interesting to know if cement does exhale CO_2, and if similar accidents have been noticed.

MEDICAL EXAMINATION OF RECRUITS.

DR. G. F. P. GIBBONS, O.B.E. (Desborough) writes: Now that the Government is making a special effort to secure recruits for the Territorial Army the question of remuneration for the examination of such men will be of importance to many practitioners. I was asked to deal with any possible recruits in my area and was offered the enticing fee of 2s. per man! The forms to be filled up in duplicate can quite successfully vie with those required for a life assurance proposal. Could not the Association take up this matter with the War Office with a view to fixing a reasonable fee for such examinations?

CHILDBIRTH AND LACTATION.

DR. JOSIAH OLDFIELD writes from Darliston, Jamaica: In this age, when women are so apt to wish to avoid "the pains and perils of childbirth," it is pleasant to record that here in Jamaica the advent of a baby is not preluded by anxiety nor accompanied by difficulties. The negro woman is strongly and stoutly built, her limbs are rounded, shapely, and symmetrical, her spine is straight, and her carriage erect. Negro women regularly walk distances of ten to thirty miles, carrying loads on their heads of from twenty to sixty pounds. Their total clothing is a loose cotton dress and a pair of cotton drawers, with a handkerchief round the head. Their diet is chiefly yams, sweet potato, sugar cane, banana, orange, breadfruit, beans, and rice. It is important to note that on this dietary the nursing mother has always an ample supply of milk, and that artificial feeding of babies is almost unknown.

A MODERNIZED DRUG LIST.

MESSRS. ALLEN AND HANBURYS have issued to the medical profession a well-produced little book entitled *Medicamenta Recentia* containing an alphabetical list of the articles manufactured by the firm, with particulars of their composition and dosage. An improvement from the point of view of utility might be to increase the number of cross-references, as the busy practitioner is apt to forget the trade-mark names of articles; for instance, we cannot trace the brand of hydrogen peroxide, which we know the firm manufactures, under either "hydrogen" or "peroxide," while suppositories also are hidden away under some other name.

A TALL TALISMAN.

WE have received from an I.M.S. officer a delightful business circular, issued in all seriousness by a native firm in Calcutta, advertising a "Talisman" which they manufacture. We quote from the circular: "By its use (by its use means simply wearing it round the neck, waist, or arms) one will be free from all disease, all will be blessed with success in every thing and in every act. It prevents untimely death and early decrepitude. A man is sure to get rich within the shortest possible time whether he is engaged in service, commerce, trade, arts, etc., if he prefers to wear one of the wonderful Talismans. It is sure to make him happy and blessed by surrounding him with a merry group of healthy children and beautiful and faithful wife." The testimonials printed are even more ingenuous than this exordium. In every case the full name and address of the writer is given. One gentleman writes: "Allow me to tender my heart-felt thanks for the good that your Talisman has done to me. I passed this year under great difficulties the LL.B. examination." Another: "After the use of your Talisman my uncle, Mr. —— of —— Hospital, has received Honours from Government." An official: "On the very next day on wearing your Talisman my pay was increased by 100 rs. The effects are wonderful." Another official: "I cannot find words to express the efficacy of your Talisman. My circumstances in pecuniary matters were really bad, and there has been marked improvement." Health is improved as well as the pocket. One gentleman in an official position writes: "I derived much benefit from your Talisman, which cured insanity of my wife, who was suffering from it for the last 15 years. Send another!" Another official: "Your wonderful Talisman has completely cured my son from all diseases. He looks now in colour like lotus flower and strength like Bheema." This wonder-worker can be obtained at the low figure of one rupee four annas, or, in a gold cover, five rupees.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 30, 31, 34, 35, 36, and 37 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 32, 33, and 34.

THE appointments of certifying factory surgeons at Manchline (Ayrshire) and Oldham (Lancashire) are vacant.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	9	0
Each additional line...	0	1	6
Whole single column (three columns to page)	7	10	0
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Half page	10	0	0
Whole page	20	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.